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MULTI V™ SYNC II System
Heat Recovery Outdoor Unit R410A
SERVICE MANUAL R410A

MODEL : ARUB Series

CAUTION

Before Servicing the unit, read the safety precautions in General SVC manual.
Only for authorized service personnel.

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Safety Precautions

To prevent injury to the user or other people and property damage, the following instructions must be followed.

■ Incorrect operation due to ignoring instruction will cause harm or damage. The seriousness is classified by the following indications.

⚠WARNING	This symbol indicates the possibility of death or serious injury.
⚠CAUTION	This symbol indicates the possibility of injury or damage to properties only.

■ Meanings of symbols used in this manual are as shown below.

⃠	**Be sure not to do.**
❗	**Be sure to follow the instruction.**

⚠WARNING

■ Installation

Have all electric work done by a licensed electrician according to "Electric Facility Engineering Standard" and "Interior Wire Regulations" and the instructions given in this manual and always use a special circuit.

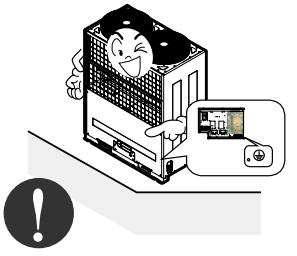
- If the power source capacity is inadequate or electric work is performed improperly, electric shock or fire may result.

Ask the dealer or an authorized technician to install the air conditioner.

- Improper installation by the user may result in water leakage, electric shock, or fire.

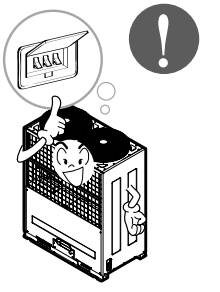
Always ground the product.

- There is risk of fire or electric shock.



Always intstall a dedicated circuit and breaker.

- Improper wiring or installation may cause fire or electric shock.



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For re-installation of the installed product, always contact a dealer or an Authorized Service Center.

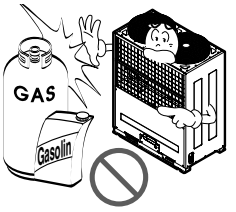
• There is risk of fire, electric shock, explosion, or injury.

Do not install, remove, or re-install the unit by yourself (customer).

• There is risk of fire, electric shock, explosion, or injury.

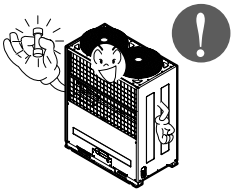
Do not store or use flammable gas or combustibles near the air conditioner.

• There is risk of fire or failure of product.



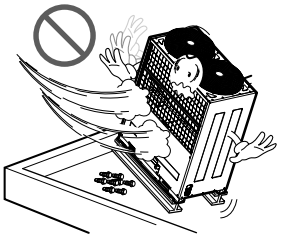
Use the correctly rated breaker or fuse.

• There is risk of fire or electric shock.



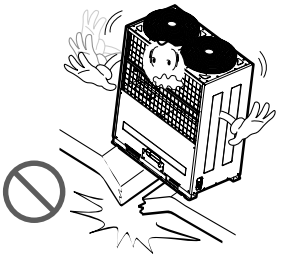
Prepare for strong wind or earthquake and install the unit at the specified place.

• Improper installation may cause the unit to topple and result in injury.



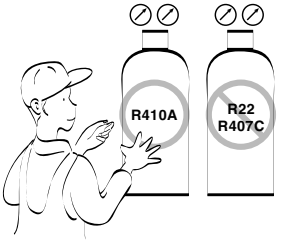
Do not install the product on a defective installation stand.

• It may cause injury, accident, or damage to the product.



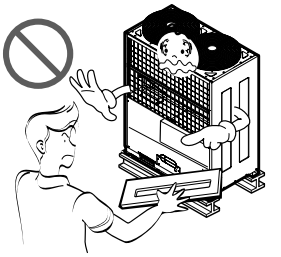
When installing and moving the air conditioner to another site, do not charge it with a different refrigerant from the refrigerant specified on the unit.

• If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged.



Do not reconstruct to change the settings of the protection devices.

• If the pressure switch, thermal switch, or other protection device is shorted and operated forcibly, or parts other than those specified by LGE are used, fire or explosion may result.



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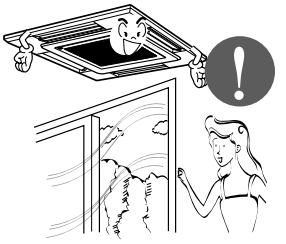
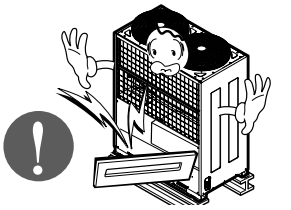
Ventilate before operating air conditioner when gas leaked out.

- It may cause explosion, fire, and burn.



Securely install the cover of control box and the panel.

- If the cover and panel are not installed securely, dust or water may enter the outdoor unit and fire or electric shock may result.

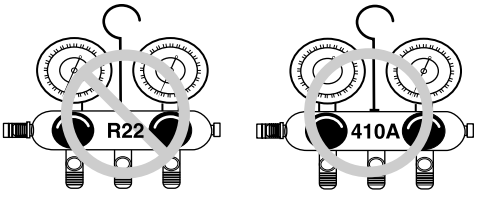


If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration from exceeding the safety limit when the refrigerant leaks.

- Consult the dealer regarding the appropriate measures to prevent the safety limit from being exceeded. Should the refrigerant leak and cause the safety limit to be exceeded, harzards due to lack of oxygen in the room could result.

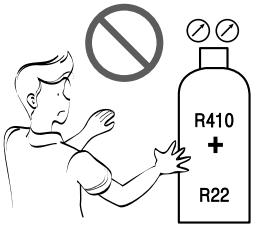
Don't use the existing manifold gage for R22 refrigerant.

- Use the manifold gage for high pressure (R410A) as possible as for stable refrigerant filling.



Don't mix and use the R22 pipe and the installation appliances that were used until now

- Mixing the oil of R22 and R410A may cause failure of the unit due to hydrolysis.



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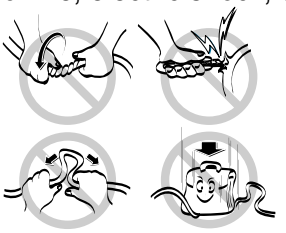
■ Operation

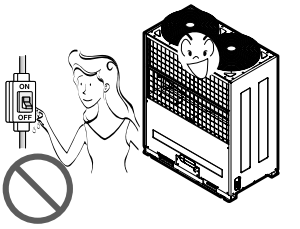
Do not damage or use an unspecified power cord.

• There is risk of fire, electric shock, explosion, or injury.



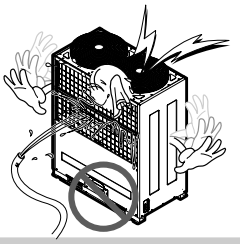
Use a dedicated outlet for this appliance.

• There is risk of fire or electrical shock.



Be cautious that water could not enter the product.

• There is risk of fire, electric shock, or product damage.

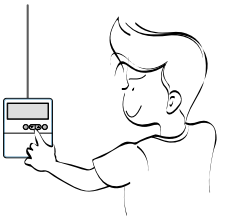


Do not touch the power switch with wet hands.

• There is risk of fire, electric shock, explosion, or injury.

Take care so that children should not randomly operate the wire remote control for play.

• Frequent conversion to cold or heat mode may cause failure of the unit.



When the product is soaked (flooded or submerged), contact an Authorized Service Center.

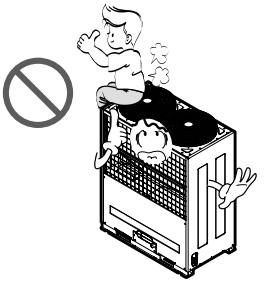
• There is risk of fire or electric shock.

Be cautious not to touch the sharp edges when installing.

• It may cause injury.

Take care to ensure that nobody could step on or fall onto the outdoor unit.

• This could result in personal injury and product damage.



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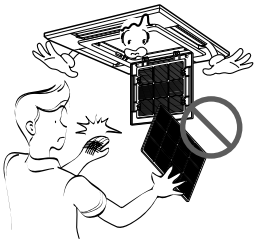
Do not open the inlet grill of the product during operation. (Do not touch the electrostatic filter, if the unit is so equipped.)

• There is risk of physical injury, electric shock, or product failure.

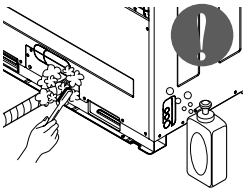


⚠ CAUTION

■ Installation

Always check for gas (refrigerant) leakage after installation or repair of product.

• Low refrigerant levels may cause failure of product.

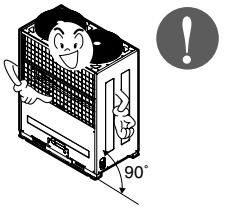


Do not install the product where the noise or hot air from the outdoor unit could damage the neighborhoods.

• It may cause a problem for your neighbors.

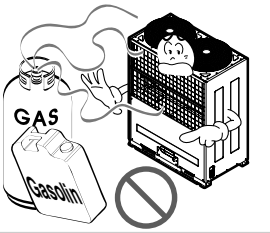
Keep level even when installing the product.

• To avoid vibration or water leakage.



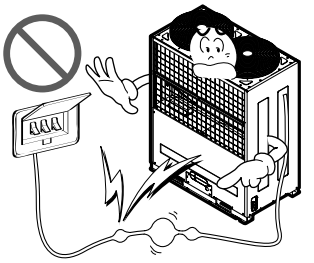
Do not install the unit where combustible gas may leak.

• If the gas leaks and accumulates around the unit, an explosion may result.



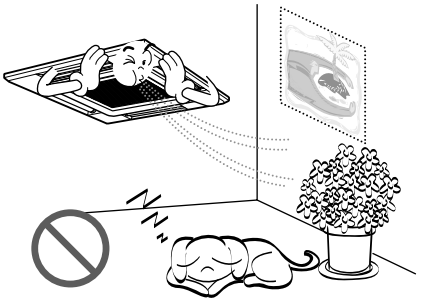
Use power cables of sufficient current carrying capacity and rating.

• Cables that are too small may leak, generate heat, and cause a fire.



Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer air conditioner, not a precision refrigeration system.

• There is risk of damage or loss of property.



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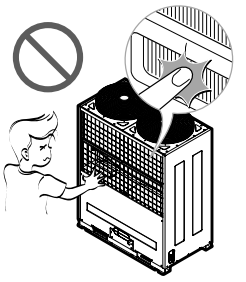
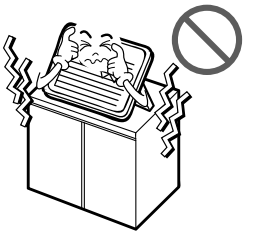
Keep the unit away from children. The heat exchanger is very sharp.

- It can cause the injury, such as cutting the finger. Also the damaged fin may result in degradation of capacity.



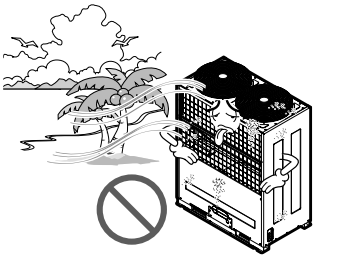
When installting the unit in a hospital, communication station, or similar place, provide sufficient protection against noise.

- The inverter equipment, private power generator, high-frequency medical equipment, or radio communication equipment may cause the air conditioner to operate erroneously, or fail to operate. On the other hand, the air conditioner may affect such equipment by creating noise that disturbs medical treatment or image broadcasting.



Do not install the product where it is exposed to sea wind (salt spray) directly.

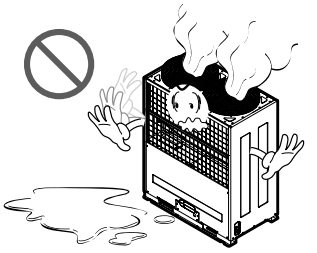
- It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.



■ Operation

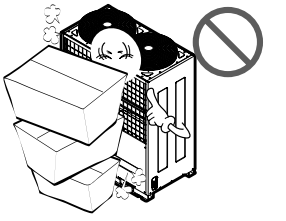
Do not use the air conditioner in special environments.

- Oil, steam, sulfuric smoke, etc. can significantly reduce the performance of the air conditioner or damage its parts.



Do not block the inlet or outlet.

- It may cause failure of appliance or accident.



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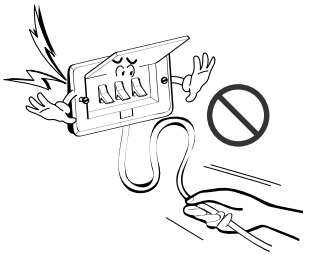
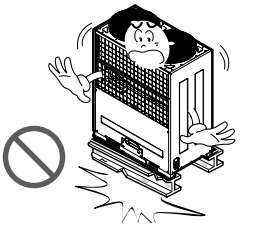
Make the connections securely so that the outside force of the cable may not be applied to the terminals.

- Inadequate connection and fastening may generate heat and cause a fire.



Be sure the installation area does not deteriorate with age.

- If the base collapses, the air conditioner could fall with it, causing property damage, product failure, and personal injury.

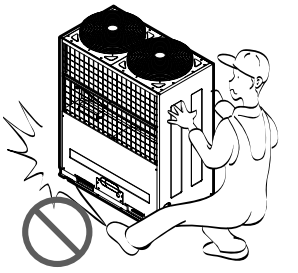


Install and insulate the drain hose to ensure that water is drained away properly based on the installation manual.

- A bad connection may cause water leakage.

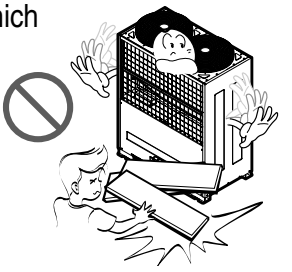
Be very careful about product transportation.

- Only one person should not carry the product if it weighs more than 20 kg.
- Some products use PP bands for packaging. Do not use any PP bands for a means of transportation. It is dangerous.
- Do not touch the heat exchanger fins. Doing so may cut your fingers.
- When transporting the outdoor unit, suspending it at the specified positions on the unit base. Also support the outdoor unit at four points so that it cannot slip sideways.



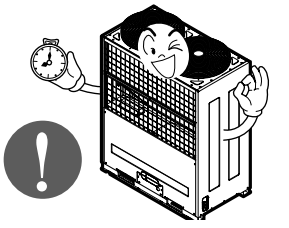
Safely dispose of the packing materials.

- Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries.
- Tear apart and throw away plastic packaging bags so that children may not play with them. If children play with a plastic bag which was not torn apart, they face the risk of suffocation.



Turn on the power at least 6 hours before starting operation.(In case of outdoor temperature below 10°C)

- Starting operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.



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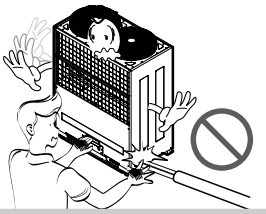
Do not touch any of the refrigerant piping during and after operation.

• It can cause a burn or frostbite.

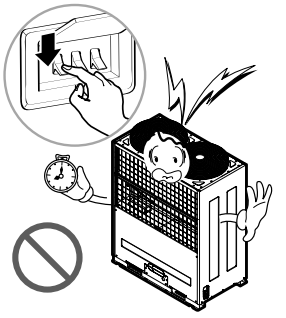


Do not operate the air conditioner with the panels or guards removed.

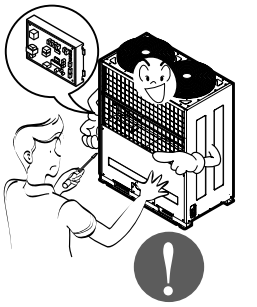
• Rotating, hot, or high-voltage parts can cause injuries.

Do not directly turn off the main power switch after stopping operation.

• Wait at least 5 minutes before turning off the main power switch. Otherwise it may result in water leakage or other problems.

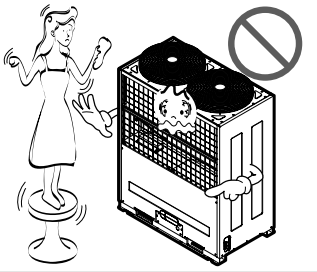


Auto-addressing should be done in condition of connecting the power of all indoor and outdoor units. Auto-addressing should also be done in case of changing the Indoor unit PCB.



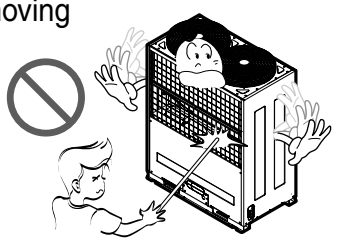
Use a firm stool or ladder when cleaning or maintaining the air conditioner.

• Be careful and avoid personal injury.



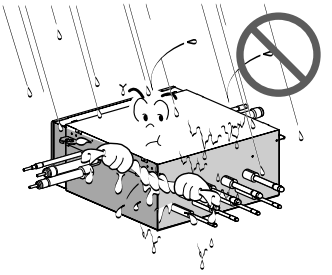
Do not insert hands or other objects through the air inlet or outlet while the air conditioner is plugged in.

• There are sharp and moving parts that could cause personal injury.



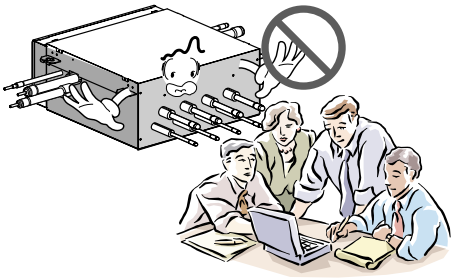
Avoid a place where rain may enter since the HR unit is for indoor

• There is risk of property damage, failure of product or electric shock.



Install the HR unit at a place in which it is not affected by operation mode changing noise.

• Installation within cell such as meeting room etc, may disturb business due to noise.



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Part 1
General Information

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1. Model Names

1.1 Outdoor Unit

Power Supply	8HP	10HP	12HP	14HP	16HP	18HP	20HP
3Ø, 380 ~ 415V, 50Hz 3Ø, 380V, 60Hz	80LT2	100LT2	120LT2	140LT2	160LT2	180LT2	200LT2

Power Supply	22HP	24HP	26HP	28HP	30HP	32HP	34HP
3Ø, 380 ~ 415V, 50Hz 3Ø, 380V, 60Hz	220LT2	240LT2	260LT2	280LT2	300LT2	320LT2	340LT2

Power Supply	36HP	38HP	40HP	42HP	44HP	46HP	48HP
3Ø, 380 ~ 415V, 50Hz 3Ø, 380V, 60Hz	360LT2	380LT2	400LT2	420LT2	440LT2	460LT2	480LT2

Heat Recovery	ARUB

1.2 HR Unit

Power supply	2 rooms	3 rooms	4 rooms
1Ø,220~240V,50/60 Hz	PRHR020	PRHR030	PRHR040

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2. External Appearance

2.1 Outdoor Units

ARUB80LT2
ARUB100LT2
ARUB120LT2
ARUB140LT2
ARUB160LT2

8, 10, 12, 14, 16HP

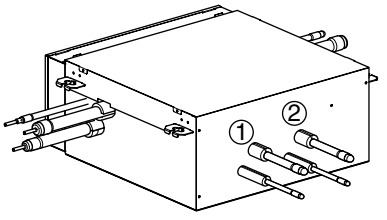
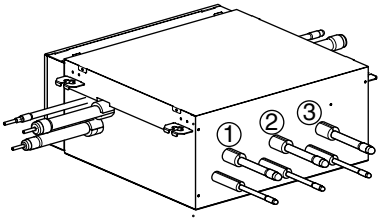
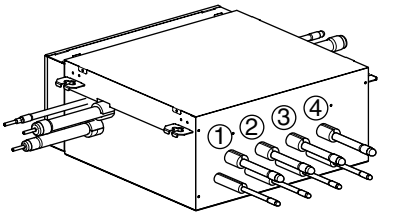
ARUB180LT2
ARUB200LT2
ARUB220LT2
ARUB240LT2
ARUB260LT2
ARUB280LT2
ARUB300LT2
ARUB320LT2

18, 20, 22, 24, 26, 28, 30, 32HP

ARUB340LT2
ARUB360LT2
ARUB380LT2
ARUB400LT2
ARUB420LT2
ARUB440LT2
ARUB460LT2
ARUB480LT2

34, 36, 38, 40, 42, 44, 46, 48HP

2.2 HR Unit

PRHR020	PRHR030	PRHR040
 (For 2 rooms)	 (For 3 rooms)	 (For 4 rooms)

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3. Combination of Outdoor Units

System Capacity	Number of Units 50Hz/60Hz	Module				
		8	10	12	14	16
8HP	1	1	-	-	-	-
10HP	1	-	1	-	-	-
12HP	1	-	-	1	-	-
14HP	1	-	-	-	1	-
16HP	1	-	-	-	-	1
18HP	2	1	1	-	-	-
20HP	2	1	-	1	-	-
22HP	2	1	-	-	1	-
24HP	2	1	-	-	-	1
26HP	2	-	-	1	1	-
28HP	2	-	-	-	2	-
30HP	2	-	-	-	1	1
32HP	2	-	-	-	-	2
34HP	3	1	-	1	1	-
36HP	3	1	-	-	2	-
38HP	3	1	-	-	1	1
40HP	3	1	-	-	-	2
42HP	3	-	1	-	-	2
44HP	3	-	-	-	2	1
46HP	3	-	-	-	1	2
48HP	3	-	-	-	-	3

■ A maximum of 48HP can be obtained by combining 8, 10, 12, 14 and 16HP

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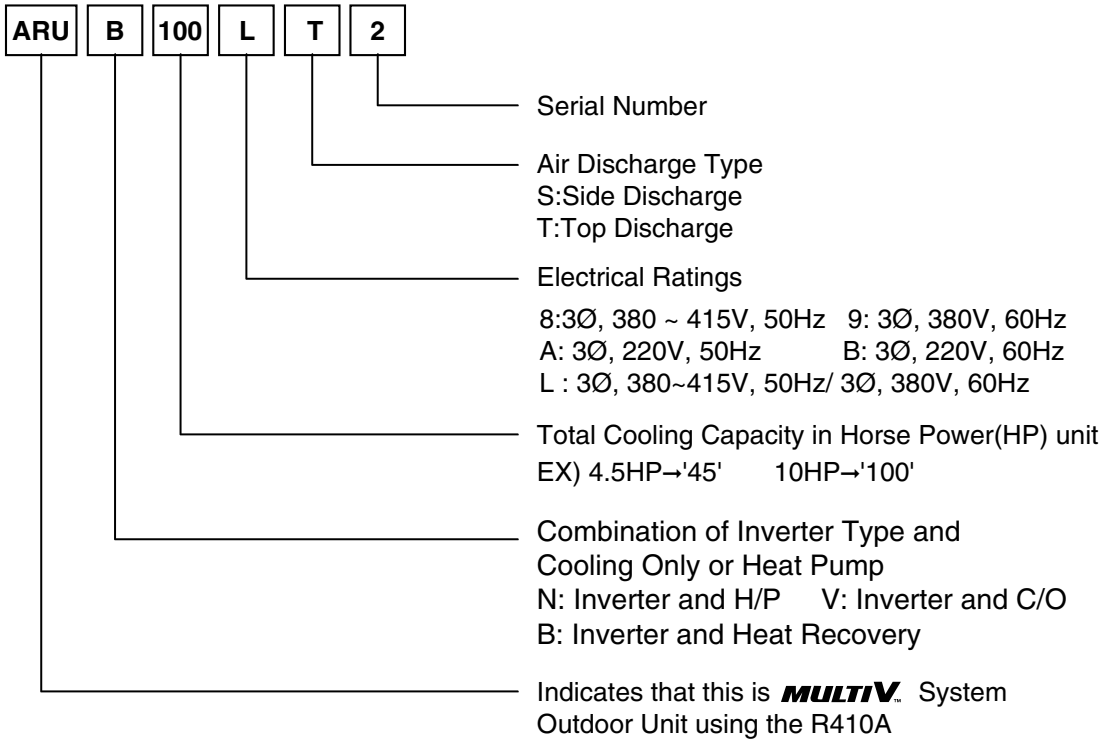
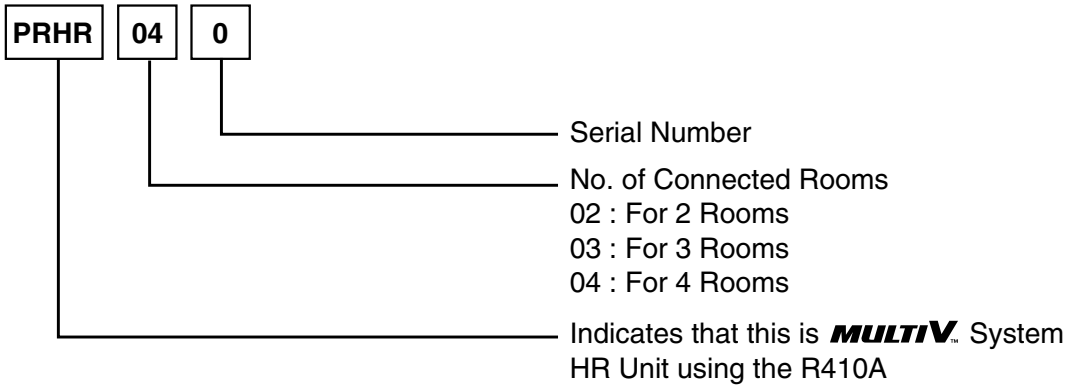
4. Nomenclature

4.1 Outdoor Unit


ARU
B
100
L
T
2
Serial Number
Air Discharge Type
S:Side Discharge
T:Top Discharge
Electrical Ratings
8:3Ø, 380 ~ 415V, 50Hz 9: 3Ø, 380V, 60Hz
A: 3Ø, 220V, 50Hz B: 3Ø, 220V, 60Hz
L : 3Ø, 380~415V, 50Hz/ 3Ø, 380V, 60Hz
Total Cooling Capacity in Horse Power(HP) unit
EX) 4.5HP→'45' 10HP→'100'
Combination of Inverter Type and
Cooling Only or Heat Pump
N: Inverter and H/P V: Inverter and C/O
B: Inverter and Heat Recovery
Indicates that this is MULTI V System
Outdoor Unit using the R410A

4.2 HR Units



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Part 2
Outdoor Units

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ARUB Series

• **Functions 19**

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1. Basic Control

1.1 Normal Operation

Actuator	Cooling operation	Heating operation	Stop state
Compressor	Fuzzy control	Fuzzy control	Stop
Fan	Fuzzy control	Fuzzy control	Stop
Main EEV	Full open	Fuzzy control	Before 15 min. : Max. pulse After 15 min. : Min. pulse
4 way valve	Off	On	After 60 min. : Off
Subcooling EEV	Fuzzy control	• Normal : minimum pulse • Avoiding control of high discharge temperature	Before 15 min. : Max. pulse After 15 min. : Min. pulse
Indoor unit EEV	Superheat fuzzy control	Subcooling fuzzy control	Before 10 min. : Min. pulse After 10 min. : Max. pulse

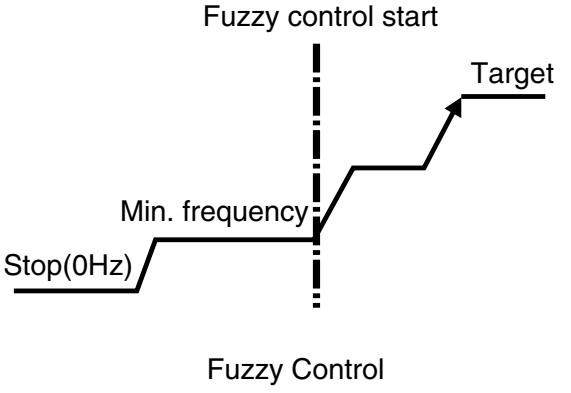
Note : Heating operation is not functional at an outdoor air temperature of 27°C or more.
Cooling operation is not functional at an outdoor air temperature of 2°C or less with indoor unit combination of 10% or less

1.2 Compressor Control

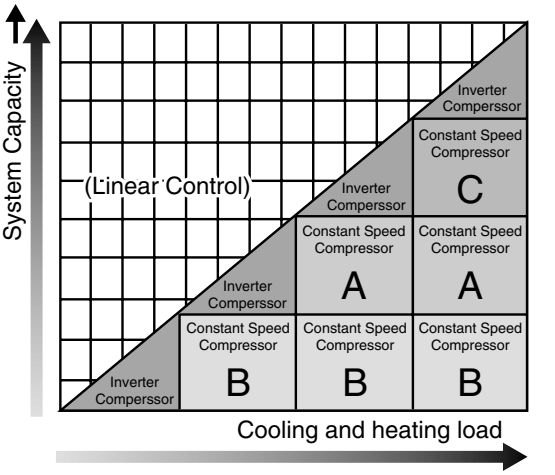
Fuzzy control : Maintain evaporating temperature(Te) to be constant on cooling mode and condensing temperature(Tc) on heating mode by Fuzzy control to ensure the stable system performance.
(Tc:47 ~51°C, Te:2 ~ 5°C)
(1) Cooling mode
Te can be set by initial dip switch setting. (Normal mode, capacity up mode, and energy save mode)

(2) Heating mode
Tc can be set by initial dip switch setting. (Normal mode, capacity up mode, and energy save mode)

Note: By setting dip switch, Te and Tc are decided simultaneously.



Fuzzy Control



Inverter linear control as cooling and heating load increasing

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1.3 Master and Slave Unit's EEV Control

(1) Main EEV control
Main EEV operates with fuzzy control rules to keep the degree of super Heat(Superheat) (about 3°C)at the evaporator outlet stable during heating mode
The degree of Superheat = Tsuction - Tevaporation
Tsuction : temperature at suction pipe sensor(°C)
Tevaporation : evaporation temperature equivalent to low pressure(°C)

(2) Subcooling EEV control(about 15°C)
Subcooling EEV works with fuzzy rules to keep the degree of Subcool at the outlet of subcooler during cooling mode
The degree of Subcool = Tcondensation - Tliquid
Tliquid : temperature at outlet of subcooler(°C)
Tcondensation : condensation temperature equivalent to high pressure(°C)

(3) Avoiding excessive high discharge temperature : when main EEV opens some given opening (R410A : 800 pls) and discharge temperature is above 85°C in heating operation, subcooling EEV may control the "subcooling out temperature-evaporating temperature" to be some given difference.

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2. Special Control

2.1 Oil Return Control

2.1.1 Oil return control on cooling mode

Oil return operation recovers oil amount in compressor by collecting oil accumulated in pipe.
Each cycle component operates as following table during oil return operation.

Outdoor Unit

Component	Starting	Running	Ending
Inverter compressor	25Hz	Setting Value	40Hz
Constant speed compressor	OFF	ON	OFF
FAN	Normal control	Normal control	Normal control
Main EEV	Max. pulse	Max. pulse	Max. pulse
Subcooling EEV	Normal control	Main. pluse	100 pulse
4way valve	OFF	OFF	OFF
Hot gas bypass valve	Normal control	Normal control	Normal control

Indoor Unit

Component	Starting	Running	Ending
Fan	Normal control	OFF	Normal control
Thermo on unit EEV	Normal control	1200 pulse	Normal control
Thermo off unit EEV	Min. pulse	1200 pulse	Min. pulse
Oil return signal	OFF	ON	OFF

- Oil return operation time : 3 min for running step
- Starting condition:every 6 hours operate
- Oil return process ends if compressor protection control starts

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2.1.2 Oil return control on heating mode

Outdoor Unit

Component	Starting	Running	Ending
Inverter compressor	25Hz	Setting Value	25Hz
Constant speed compressor	OFF	ON	OFF
FAN	Normal control	Normal control	Normal control
Main EEV	Max. pulse	Max. pulse	Max. pulse
Subcooling EEV	Normal control	Min. pulse	100 pulse
4way valve	OFF	ON	ON
Hot gas bypass valve	Normal control	Normal control	Normal control

Indoor Unit

Component	Starting	Running	Ending
Fan	Normal control	OFF	Normal control
Thermo on unit EEV	Normal control	1200 pulse	Normal control
Thermo off unit EEV	Min. pulse	1200 pulse	Min. pulse
Oil return signal	OFF	ON	OFF

- Oil return operation time : 3 min for running step
- Starting condition:same as cooling mode
- Oil return process ends if compressor protection control starts

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2.2 Defrost

Defrost operation eliminates ice attached on heat exchanger, recovering performance of heat exchanger.
Each cycle component operates as following table during defrost operation.

Outdoor Unit

Component	Starting	Running	Ending
Inverter compressor	25Hz	Setting Value	25Hz
Constant speed compressor	OFF	ON	OFF
FAN	Stop	High pressure control	50Hz
Main EEV	Normal control	Max. pulse	200 pulse
Subcooling EEV	Min. pulse	Min. pulse	Min. pulse
4way valve	On → OFF	OFF	ON
Hot gas bypass valve	Normal control	Normal control	Normal control

Indoor Unit

Component	Starting	Running	Ending
Fan	OFF	OFF	OFF
Thermo on unit EEV	Normal control	1200 pulse	Normal control
Thermo off unit EEV	Min. pulse	1200 pulse	Min. pulse

■ Ending condition

1) All heat exchanger pipe temperature are above 20°C(UW1) for 30 sec.
2) The running time of defrost operation is over 30% of the total heating time
3) If compressor protection control starts by high discharge temperature of compressor etc.

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2.3 Stopping Operation

2.3.1 Stopping operation on cooling mode

Component	Operation	Note
Inverter compressor	0Hz	-
Constant speed compressor	OFF	-
FAN	Stop	-
Main EEV	Max. pulse	After 15 min. (Before 15 min. : Min. pulse)
Subcooling EEV	Max. pulse	After 15 min. (Before 15 min. : Min. pulse)
4way valve	OFF	-
Hot gas bypass valve	OFF	After 15 min. (Before 15 Min. : ON)

2.3.2 Stopping operation on heating mode

Component	Operation	Note
Inverter compressor	0Hz	-
Constant speed compressor	OFF	-
FAN	Stop	-
Main EEV	Max. pulse	After 15 min. (Before 15 min. : Min. pulse)
Subcooling EEV	Max. pulse	After 15 min. (Before 15 min. : Min. pulse)
4way valve	OFF	After 60 min.
Hot gas bypass valve	OFF	After 15 min. (Before 15 Min. : ON)

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3. Protection Control

3.1 Pressure Protection Control

3.1.1 Pressure control on cooling mode

■ **High pressure control**

Pressure range	Compressor	Fan	Hot_gas
$P_d \geq 4003$ kPa	Stop	Stop	-
$P_d > 3676$ kPa	-5Hz/4sec.	+100RPM/4sec.	
$P_d \geq 3448$ kPa	Frequency holding	Normal control	
$P_d < 3284$ kPa	Normal control		-

■ **Low pressure control**

Pressure range	Compressor	Fan	Hot_gas
$P_s \leq 229$ kPa ① after 1min	Stop	Stop	ON
$P_s \leq 229$ kPa before ② 1min	-5Hz/4sec.	-100RPM/4sec.	
$P_s \leq 242$ kPa ③	Normal control	Normal control	
$P_s \geq 399$ kPa	Normal control		OFF

❊ Frequency holding : frequency (or RPM) is not increasing (can decrease)

3.1.2 Pressure control on heating mode

■ **High pressure control**

Pressure range	Compressor	Fan	Hot_gas
$P_d \geq 4003$kPa	Stop	Stop	ON
$P_d > 3676$kPa	-5Hz/4sec.[1)]	-50RPM/4sec.	ON
$P_d \leq 3448$kPa	Normal control	Normal control	
$P_d \leq$ Target press	Normal control		OFF

■ **Low pressure control**

Pressure range	Compressor	Fan	Hot_gas
① $P_s \leq 229$ kPa after 1min	Stop	Stop	ON
② $P_s \leq 229$ kPa before 1min	-5Hz/4sec.	+100RPM/4sec.	
③ $P_s \leq 242$ kPa	Frequency holding	Normal control	
$P_s \leq 268$kPa	Normal control		
$P_s > 307$kPa			OFF

❊ Frequency holding : frequency (or RPM) is not increasing (can decrease)

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3.2 Discharge Temperature Control

■ **Outdoor unit control**

Temperature range	Compressor	Liquid injection	Subcooling EEV
Tdis >115˚C	System stop		
105˚C<Tdis ≤112˚C	Frequency down and Constant speed compressor	On	Max. limit 490 pulse
98 ˚C<Tdis ≤103˚C	Liquid injection on No frequency up	Keep state OFF (below 100°C)	Max. limit 490 pulse
Tdis ≤98˚C	Pressure control	Off	Max. limit 300 pulse
Tdis >95˚C	Pressure control	Off	10 pulse open /10sec

■ **Indoor unit control**

Temperature range	EEV
Tdis >115˚C	System stop
103˚C < Tdis ≤115˚C	Emergency SH control
98 ˚C<Tdis ≤103˚C	Keep current control
Tdis ≤98 ˚C	SH control

3.3 Inverter Protection Control

	Nomal operation	Frequency down	System stop
AC input current	18A or less	18A or more	20A or more
Compressor current	23A or less	23A or less	34A or less

❊ AC input current is inverter input current except constant speed compressor current(Noise filter passed current)

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3.4 Liquid Back Control

■ **Cooling mode**

Discharge temperature	Indoor unit's EEV
Tdis < Tc + 12˚C	SH increasing control
Tdis > Tc + 16˚C	Normal SH control

■ **Heating mode**

Discharge temperature	Outdoor unit's EEV
Tdis < Tc + 17˚C	SH increasing control
Tdis > Tc + 18˚C	Normal SH control

※ The logic starts after 9 min. on heating mode and 4 min. on cooling mode from the compressor running.

3.5 Phase Detection

■ Main unit

If a phase is missed, 7-segment displays 50 on main PCB.
If phases are reversed, 7-segment displays 54 on main PCB.

3.6 Pressure Switch

- Main PCB has pressure sensing switch in series between compressor and power relay.
- The state of pressure sensing switch is normally on. It has small electric current from 220V AC. Never touch the connecting terminal with hand nor short two wires directly.

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4. Other Control

4.1 Initial Setup

There are 4 initial setup steps before running.
All dip switch setting must be completed before initial setup.

1) Step 1 : factory setting value display
Factory setting value is displayed in 7 segment on PCB for 24sec.
All dip switches must be set properly before step 1.

Power is on	
Master model code is displayed (3sec)	
Slave1 model code is displayed (3sec)	
Slave2 model code is displayed (3sec)	
Total capacity including slave units is displayed (2sec)	
Heat recovery : Display 2	
Factory setting(25 is normal)	
Outdoor unit type	

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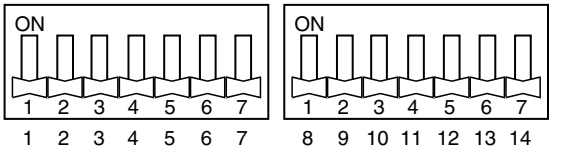
2) Step 2 : Communication check
- If all model code is displayed in 7 segment including all slave unit, communication between outdoor units is normal.
- If 104 is displayed in 7-segment, check communication wires between outdoor units and dip switch setting.

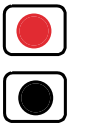
3) Step 3 : PCB error check
- After 40 sec, error check begins.

■ Master/ slave unit
- All errors of units including slave units are displayed in 7 segment.
- If communication between main PCB and inverter PCB isn't normal, 52 is displayed in 7-segment
  If communication between main PCB and fan PCB isn't normal, 105 is displayed in 7-segment.
  If error is displayed, check corresponding wires.

4) Step 4 : Auto addressing of indoor units and HR units
- Auto addressing begins when addressing button (Red) in Main PCB in pressed for 6 sec.
- During Auto addressing, 7 segment on Main PCB displays "88"
- After Auto addressing, the number of indoor units and HR units are displayed in 7 segments for 30 sec. The address of each indoor units are displayed on each wired remote controller.

Push addressing button (Red) for 6 sec.





Auto addressing starts

Auto addressing is in progress (Max. 15 min.)

The number of indoor units are displayed for 10 sec.

(35 indoor units found)

The number of HR units are displayed for 10 sec.

(4 HR units found)

Auto address process is finished.
Every indoor units display its address on the wired Remote controller and the 7 segment of main PCB is off.

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4.2 Emergency Operation

- If a compressor is out of order, the system can be run except the defective compressor by backup function.

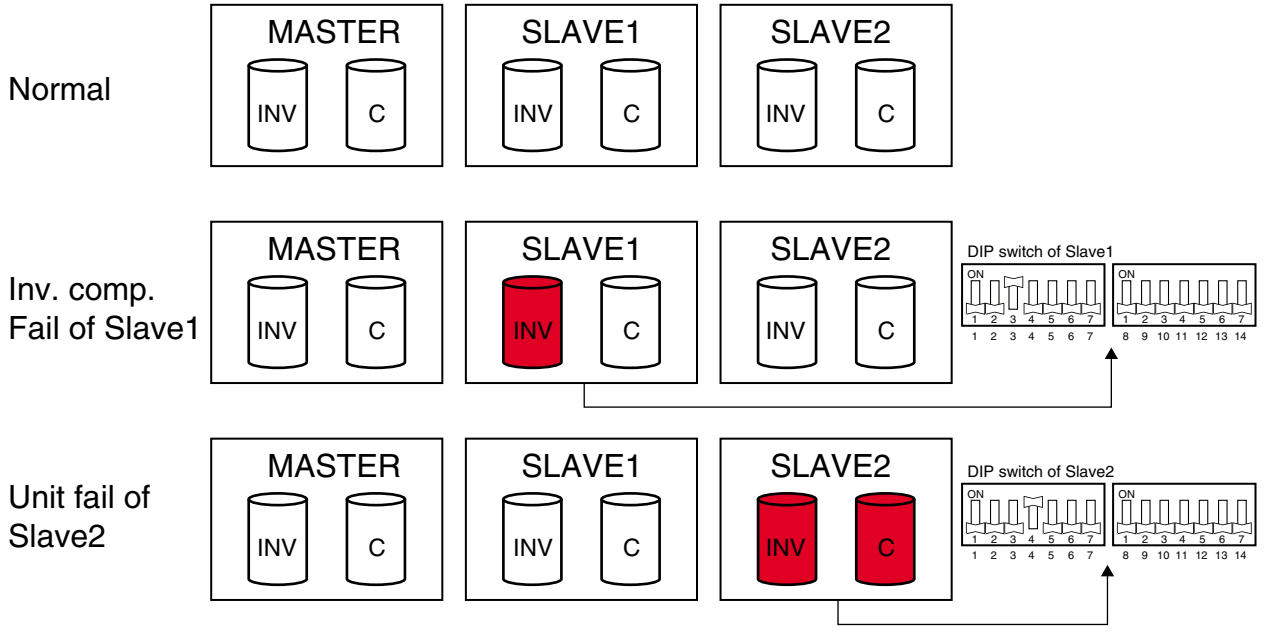
■ Automatic emergency operation(automatic back up function)

If outdoor unit detect comp defect during operation, automatic back up mode is set.

1) Inverter compressor automatic emergency operation
2) Constant compressor automatic emergency operation

■ Manual emergency operation(Manual back up function)

1) Check which compressor is broken.
2) Turn off the power.
3) Set the dip switch of defective outdoor unit.
   - Inverter compressor defect : Dip switch No.3
   - Unit defect : Dip switch No.4
4) Turn on the power.



CAUTION

Emergency operation with inverter compressor failure should not last 48 hours. → It causes other compressor failure.

During the emergency operation, cooling/heating capacity may be lower.

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Note 1)

4.3 Sensor Checking Function

Sensor checking function judges whether the current temperature of indoor and outdoor unit sensors is right or not. It checks 3 indoor temperature sensors, 9 outdoor temperature sensors, 2 outdoor pressure sensors.

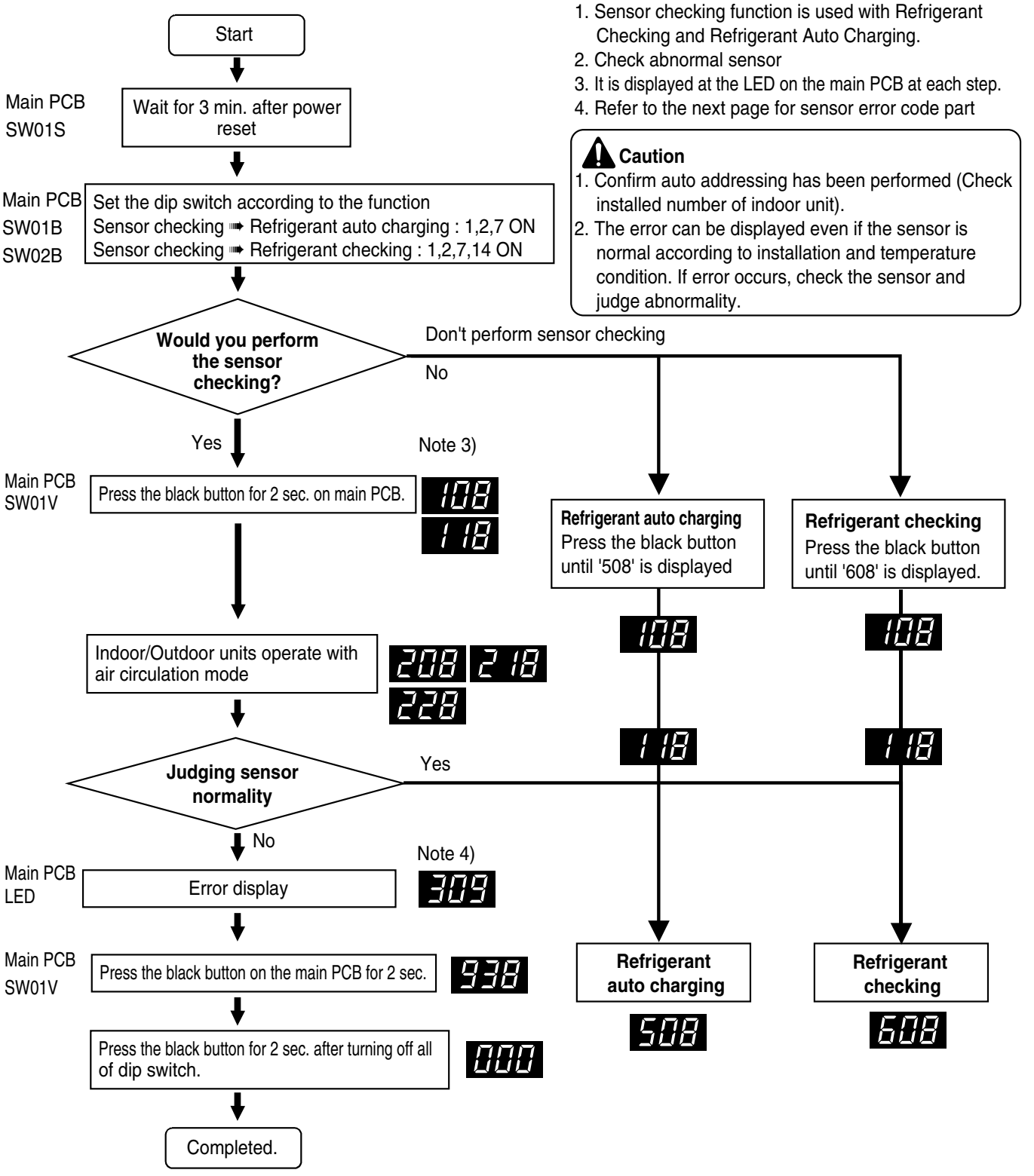
It is used for judging sensor abnormality. Note 2)

Note

1. Sensor checking function is used with Refrigerant Checking and Refrigerant Auto Charging.
2. Check abnormal sensor
3. It is displayed at the LED on the main PCB at each step.
4. Refer to the next page for sensor error code part

Caution

1. Confirm auto addressing has been performed (Check installed number of indoor unit).
2. The error can be displayed even if the sensor is normal according to installation and temperature condition. If error occurs, check the sensor and judge abnormality.



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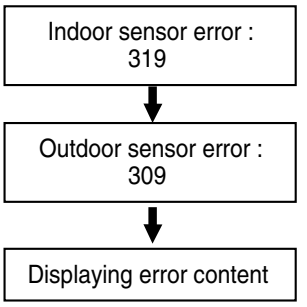
■ Sensor Check Error Code Display

In case error occurs during sensor checking process, error display is as shown below.

Following contents are displayed one after the other on the main PCB of master outdoor unit.



* 5 number of errors is displayed continuously and repeatedly.

Displaying error content

■ Indoor unit error display

1.1st and 2nd number represents indoor unit number.

2. Last number represents sensor.

1: Pipe inlet temperature sensor
2: Pipe outlet temperature sensor
3: Air temperature sensor

■ Displaying outdoor unit error

1.1st and 2nd number represents error content(code).

2.Last number represents outdoor unit number.

1 : Master
2 : Slave 1
3 : Slave 2
4 : Slave 3

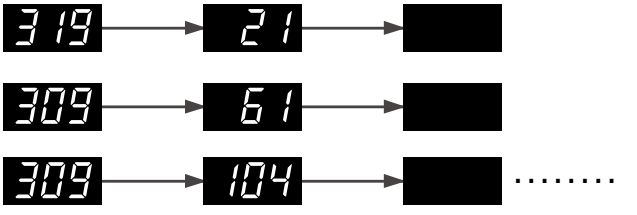
* Indoor unit number follows auto addressing number.

1	Outdoor air temperature
2	Heat exchanger 1
3	Heat exchanger 2
4	Inverter compressor discharge temperature
5	Constant speed compressor discharge temperature
6	Suction temperature
7	Liquid pipe temperature
8	Subcooling pipe in
9	Subcooling pipe out
9	High pressure sensor
10	Low pressure sensor

ex) Indoor unit No. 2 pipe inlet temperature sensor error

ex) Outdoor master unit liquid pipe temperature sensor error

ex) IDU No.2 pipe inlet temperature sensor error and master outdoor unit suction temperature sensor, slave 3 high pressure sensor error



Caution

1. Up to 5 number of errors is displayed continuously and repeatedly. In case 5 number of errors occurs, again perform sensor checking after solving errors.
2. IDU in which error occurred operates air circulation mode.

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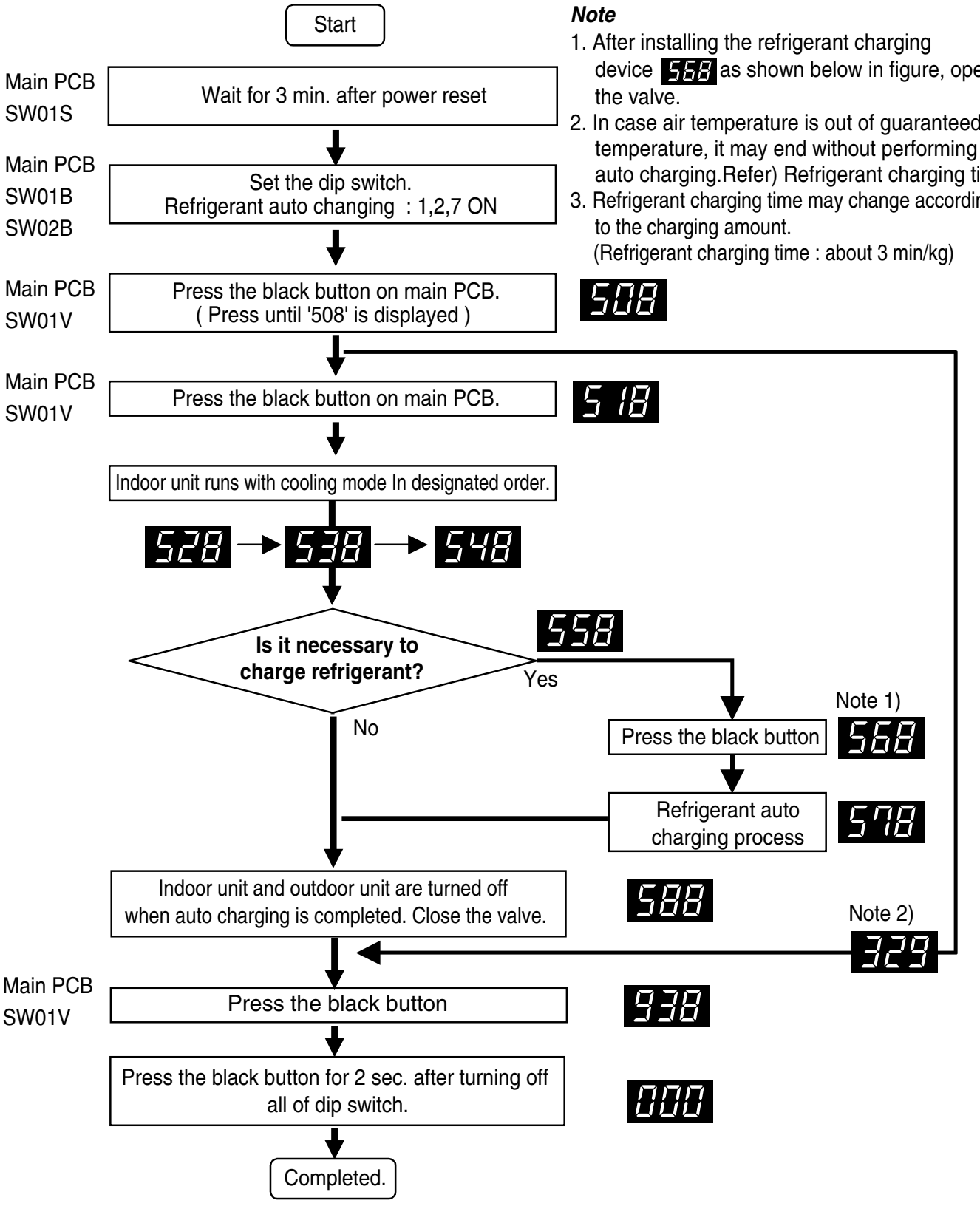
4.4 Refrigerant Auto Charging

This function charges appropriate amount of refrigerant automatically through cycle operation. It can be used when refrigerant amount Isn't certain because of SVC and leakage.



Note

1. After installing the refrigerant charging device 568 as shown below in figure, open the valve.
2. In case air temperature is out of guaranteed temperature, it may end without performing auto charging.Refer) Refrigerant charging tim
3. Refrigerant charging time may change according to the charging amount.
   (Refrigerant charging time : about 3 min/kg)

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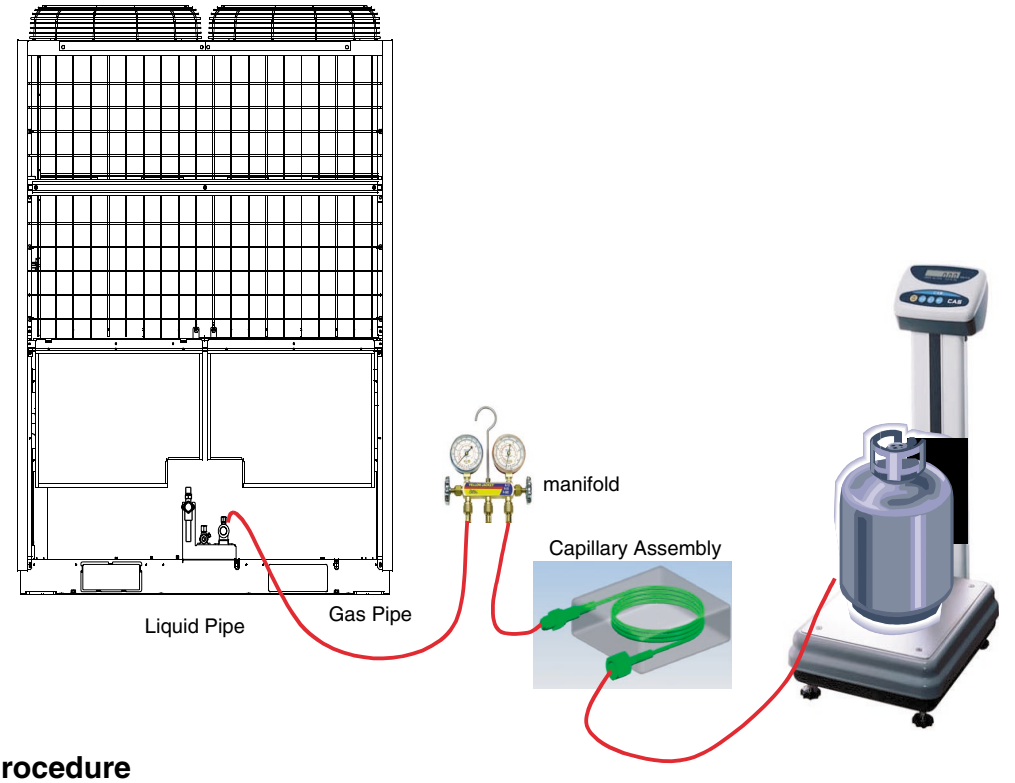

Procedure

1. Arrange manifold,capillary assembly, refrigerant vessel and scale
2. Connect manifold to the gas pipe service valve of outdoor uint as shown in the figure.
3. Connect manifold and Capillary tube.
Use designated capillary assembly only.
If designated capillary assembly isn't used, the system may get damaged.
4. Connect capillary and refrigerant vessel.
5. Purge hose and manifold.
6. After **Is displayed, open the valve and charge the refrigerant**

■ Error contents about auto refrigerant charging function

1. : Temperature Range Error (In case that indoor unit or outdoor unit is out of range)
2. : Low Pressure Descent Error (In case the system runs at low pressure limit for over 10 minutes)
3. : Rapid refrigerant inflow (In case the liquid refrigerant flows in because of not using designated capillary assembly)
4. : Instability Error(In case the high/low pressure target doesn't get satisfied for some time after the starting operation)

⚠ CAUTION

1. Guaranteed temperature range (Error will occur if temperature is out of range)
Indoor unit : 20~32°C
Outdoor unit : 0~43°C
2. For refrigerant charging, use designated device only. (Capillary Assem Set)
3. Set the Indoor unit wired remote controller temperature sensing mode as Indoor unit
4. Be careful that Indoor unit should not be thermo off.

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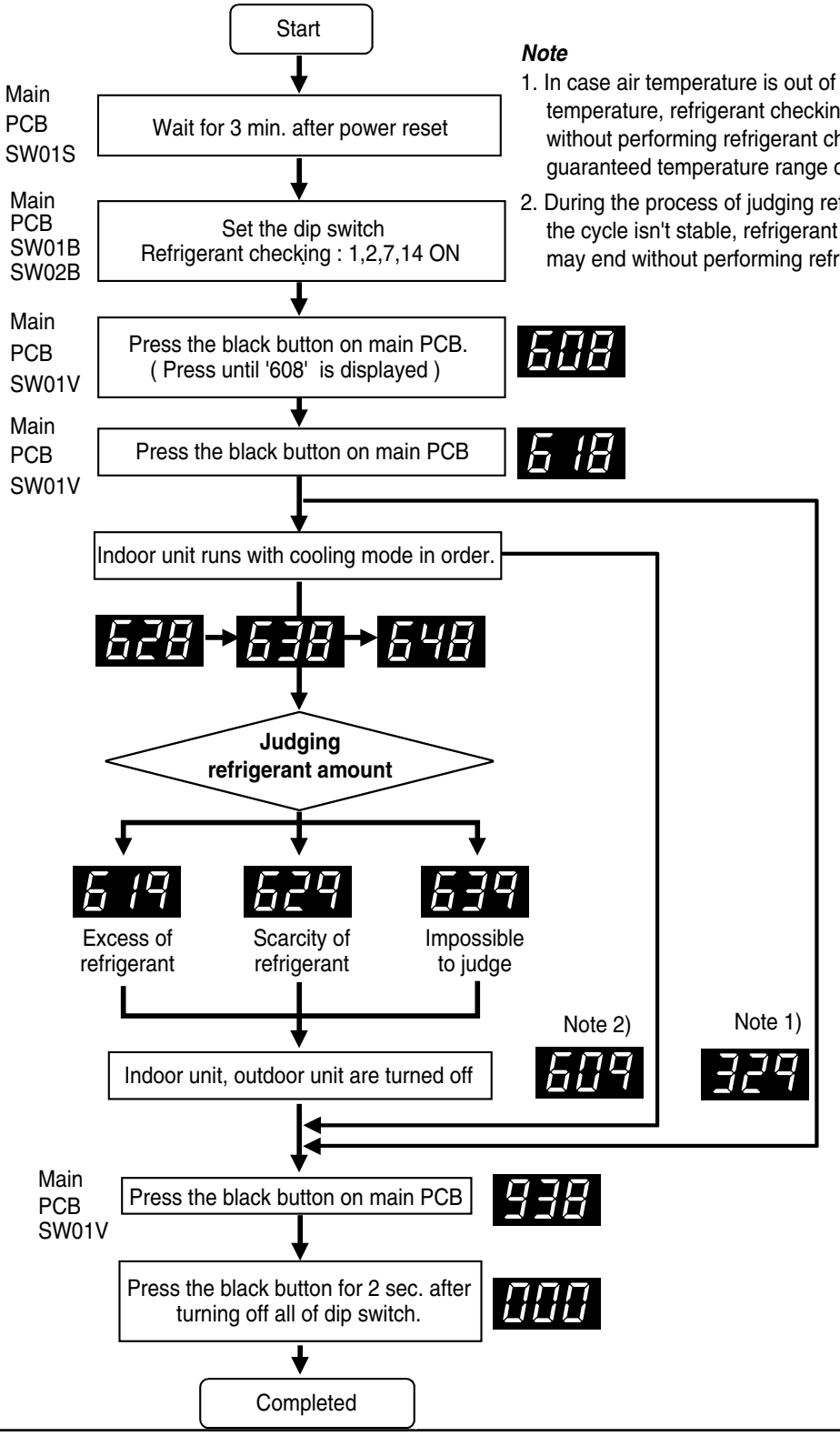
4.5 Refrigerant Checking Function

1. This function charges appropriate amount of refrigerant automatically through cycle operation.
2. This function judges refrigerant leakage and overcharging.
3. It can be used with refrigerant auto charging function.



Note

1. In case air temperature is out of guaranteed temperature, refrigerant checking function may end without performing refrigerant checking. Use guaranteed temperature range only.
2. During the process of judging refrigerant amount, if the cycle isn't stable, refrigerant checking function may end without performing refrigerant checking.

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CAUTION

1. **Guaranteed Temperature range(Error occurs out of guaranteed temperature range)**
   Indoor unit : 20~32°C (buffer ±1°C)
   Outdoor unit : 10~38°C (buffer ±1°C)
2. **Set Indoor unit wired remote controller temperature sensor setting as 'Indoor unit'.**
3. **Make certain that Indoor unit doesn't run with thermo off mode during operation.**

[Error contents about auto refrigerant charging function]

1. 329 : Temperature Range error (In case that indoor unit or outdoor unit is out of range)
2. 609 : System Unstable error (In case, After 45 min operating the system, it does not be stable)

How to cope with result of refrigerant checking

1. If the temperature is not in guaranteed temperature range, the system will not execute refrigerant checking and the system will be OFF.
2. **Excess of refrigerant(619)**
   After remove the 20% of calculated total refrigerant, recharge the refrigerant by using refrigerant auto charging function.
3. **Scarcity of refrigerant(629)**
   Charge the refrigerant by using refrigerant auto charging function.
4. **Impossible to judge(639)**
   IF the system is not in order, check the other problem except refrigerant.

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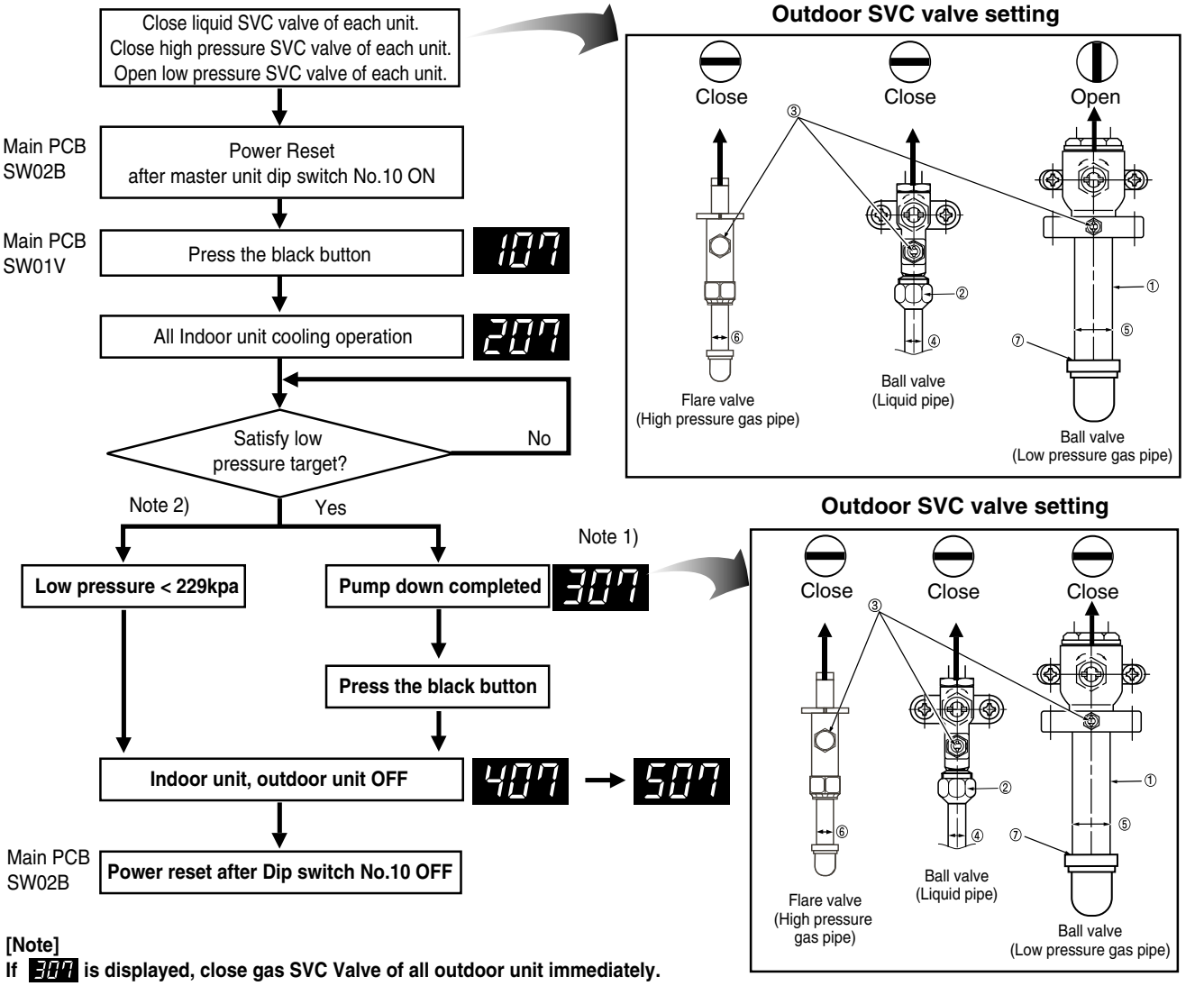
4.6 Pump Down

This function gathers the refrigerant present in the system to Outdoor unit

Use this function to store refrigerant of system in outdoor unit for leakage or indoor unit replacement.



[Note]

If 307 is displayed, close gas SVC Valve of all outdoor unit immediately.

If low pressure descends below 229 kPa, the system turns off automatically. Close the gas SVC valve immediately.

⚠ Caution

1.Use pump down function within guaranteed temperature range
  Indoor unit : 20~32°C
  Outdoor unit : 5~40°C
2. Make certain that Indoor unit doesn't run with thermo off mode during operation
3. Maximum operation time of pump down function is 30 min.
  (in case low pressure doesn't go down)
4. Press black+red button during operation to end pump down.(Indoor unit, outdoor unit off)
  407 → 507

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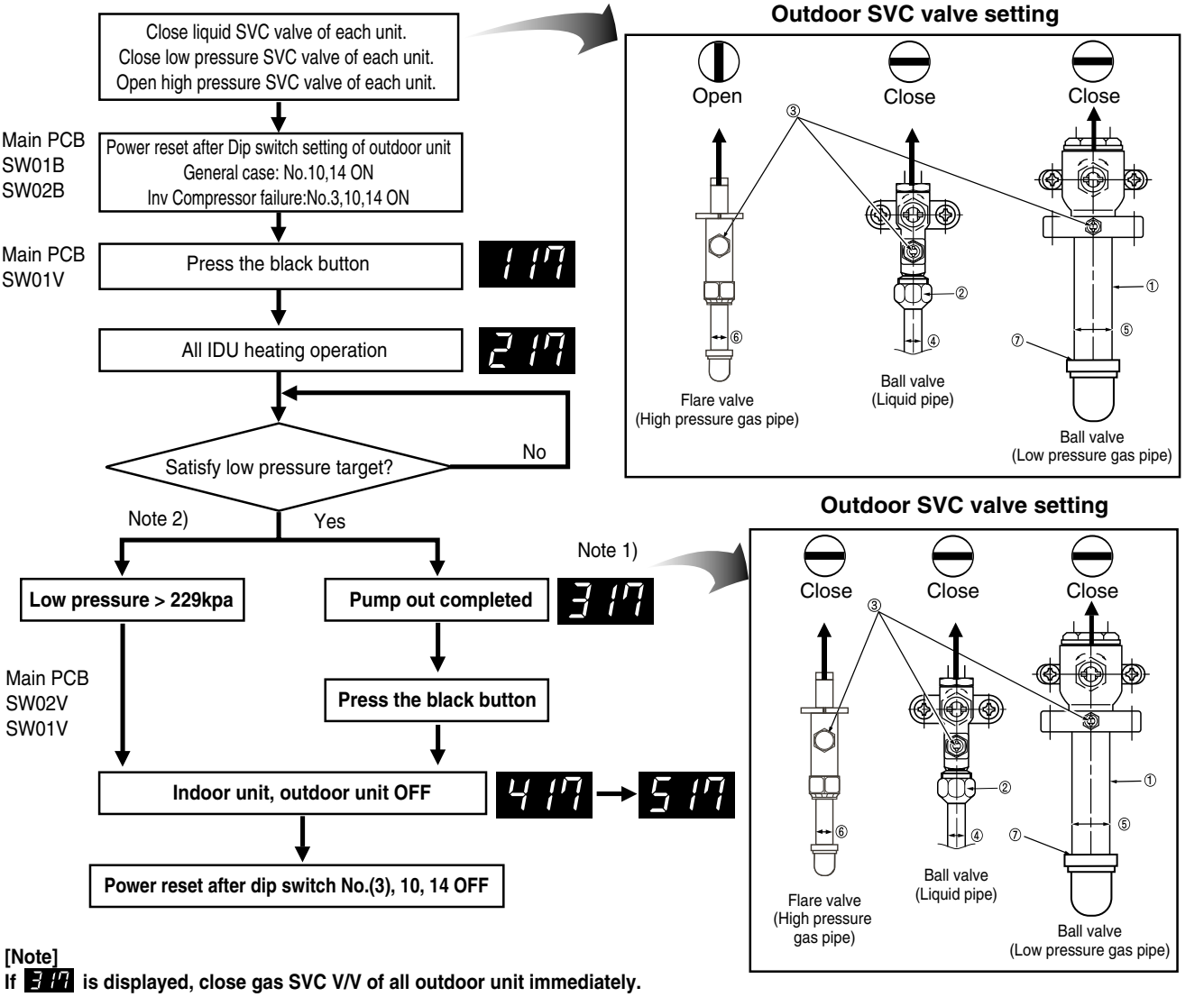
4.7 Pump Out

This function gathers the refrigerant to other outdoor unit and indoor unit.

Use this function in case of compressor failure, outdoor unit parts defect, leakage.



[Note]

If 3 1 7 is displayed, close gas SVC V/V of all outdoor unit immediately.

If low pressure descends below 229 kPa, the system turns off automatically. Close high pressure SVC valve immediately.

⚠ Caution

1.Use pump out function within guaranteed temperature range
  Indoor unit : 10~30°C
  Outdoor unit : 5~40°C
2. Make certain that indoor unit doesn't run with thermo off mode during operation
3. Pump out function takes 2~5 min. after compressor start.
  Make certain that indoor unit doesn't run with thermo off mode during operation
  (in case low pressure doesn't go down)
4. Press black+red button during operation to end pump out.(Indoor unit, outdoor unit off)
  4 1 7 → 5 1 7

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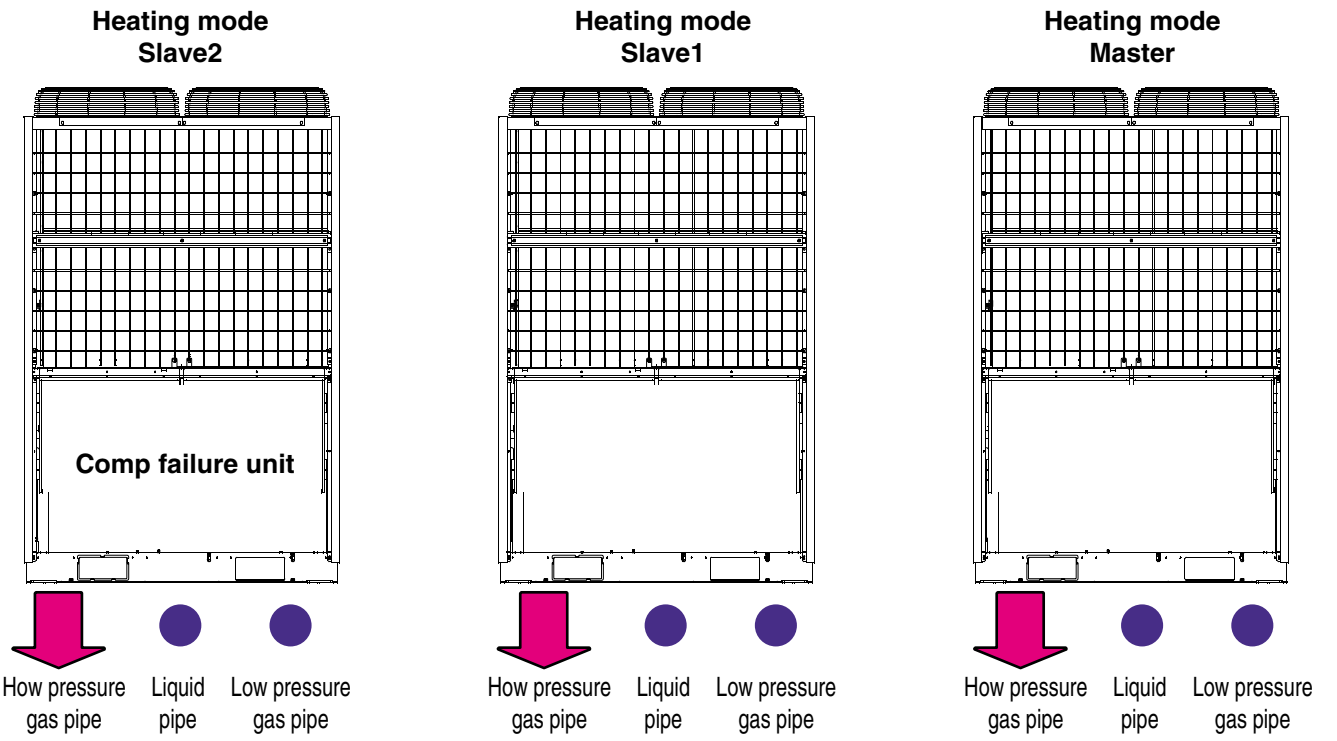
■ Example. Slave2 outdoor unit invert compressor failure



1. Close liquid pipe and low pressure gas pipe of the unit for pump out operation.
2. Operate pump out
3. Close high pressure gas pipe of unit after completion
4. End pump out
5. Eliminate refrigerant in suction port (For eliminate refrigerant port) after opening the high pressure pipe of corresponding outdoor unit. Replace compressor and perform vacuum.
6. Add the refrigerant with auto charging function

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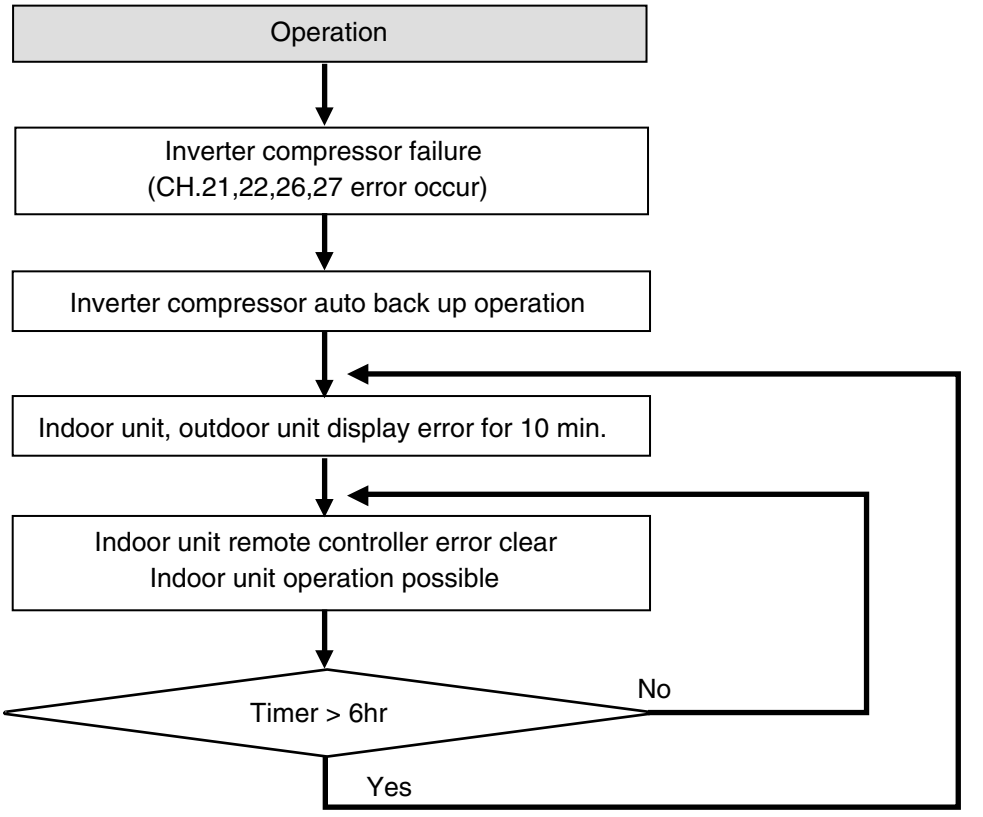
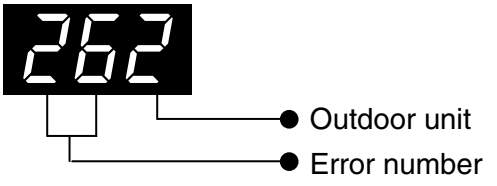
4.8 Auto Back Up Function_Inverter Compressor

This function allows the system to operate in case of inverter compressor failure by backing up compressor automatically.

SVC can be asked by displaying error to the customer every 6 hours.



Example) Slave1 unit inverter compressor start failure error occur



⚠ Caution

1. Request SVC immediately if error occurs.
2. Auto back up is set up to 1 inverter compressor
3. If inverter compressor auto back up starts, error displays for 10 min. every 6 hours.
4. Error displays continuously at the corresponding Outdoor unit.

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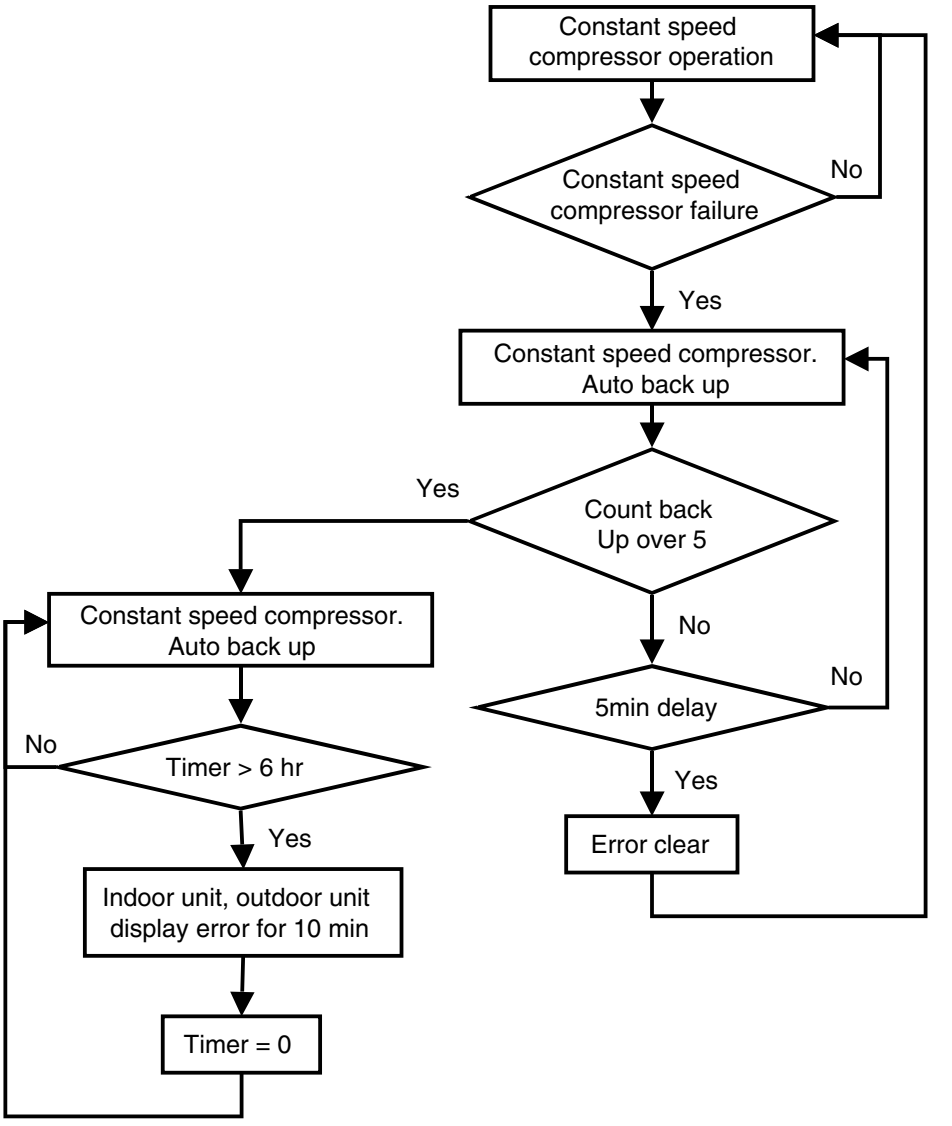
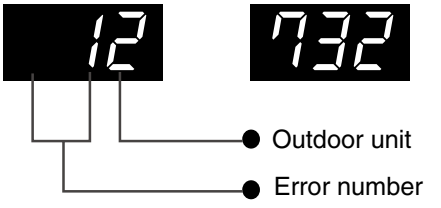
4.9 Auto Back Up Function_Constant Speed Compressor

This function allows the system to operate in case of constant speed compressor failure by backing up compressor automatically.



Example) Slave1 unit constant speed compressor failure(CH.173)



⚠ Caution

1. Request SVC immediately if error occurs

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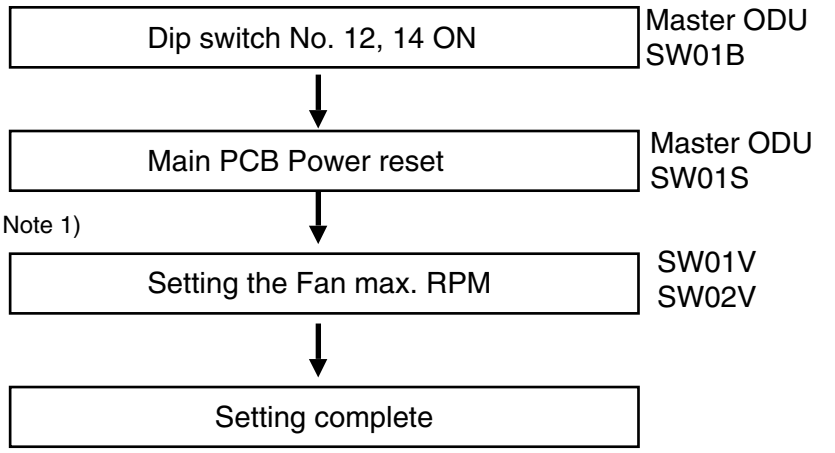
4.10 Night Silent Operation Function

In cooling mode, this function makes the outdoor unit fan operates at low RPM to reduce the fan noise of outdoor unit at night which has low cooling load.

Max. RPM Setting method



Example of Max. RPM Setting

Fan Max. RPM : Step 1

- Night silent operation start
  → 8 hours after max. Outdoor unit temp. sensing, the fan max. RPM is operated setting RPM.
- Night silent operation end
  → 9 hours after night silent operation is started, the function should be stopped automatically.

⚠ CAUTION

1. Request installer to set the function during installation.
2. In case the function is not used, set the dip switch OFF and reset the power.
3. If ODU RPM changes, cooling capacity may go down.

[Note]

1. Method for setting the fan max. RPM and operating time.

Step	Setting		Fan Max RPM	Judgment (hr)	Operation (hr)
	Black button	Red button			
1	1 time	1 time	510	8	9
2	2 times	1 time	510	6.5	10.5
3	3 times	1 time	510	5	12
4	4 times	1 time	450	8	9
5	5 times	1 time	450	6.5	10.5
6	6 times	1 time	450	5	12
7	7 times	1 time	400	8	9
8	8 times	1 time	400	6.5	10.5
9	9 times	1 time	400	5	12

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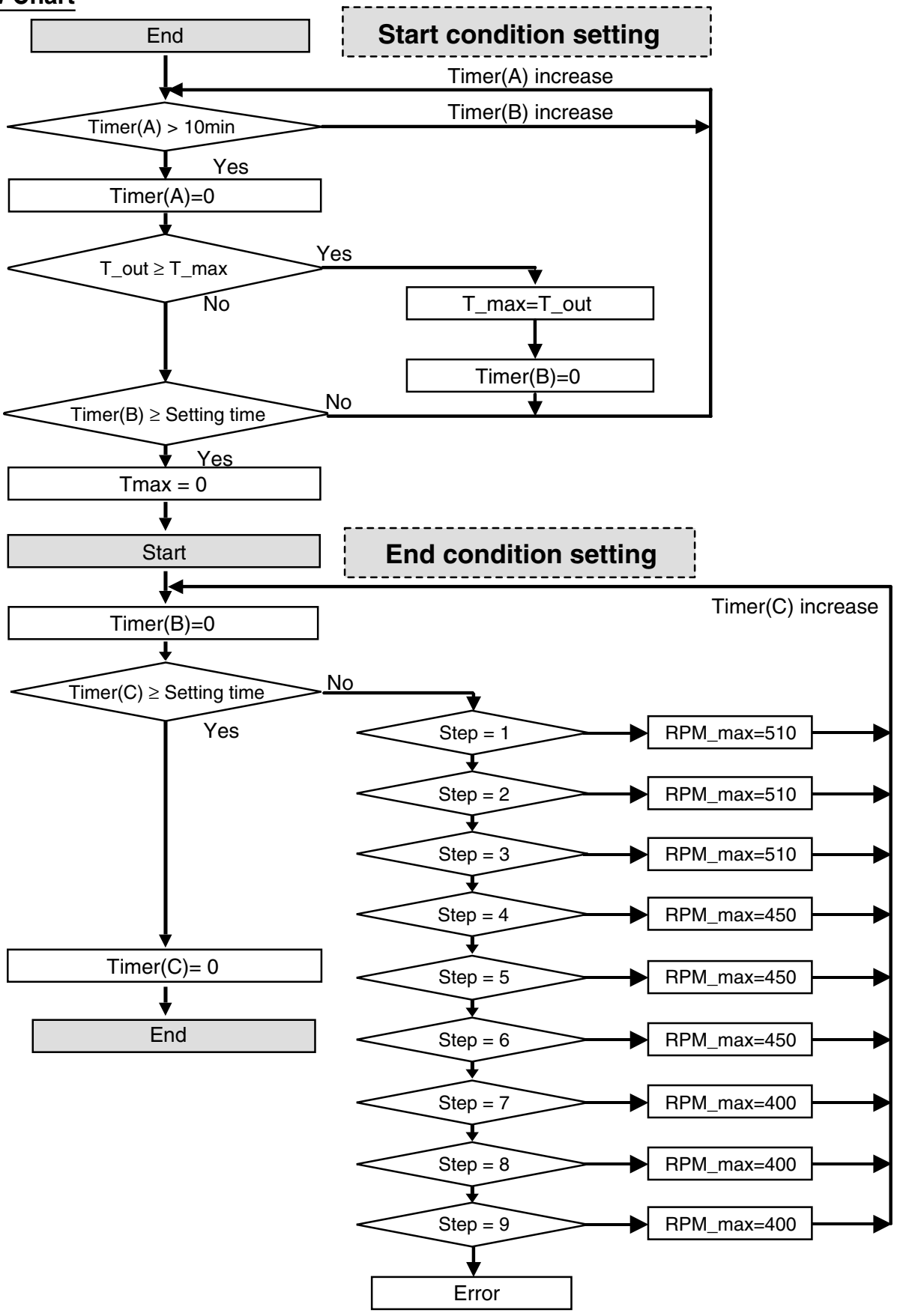
Flow Chart



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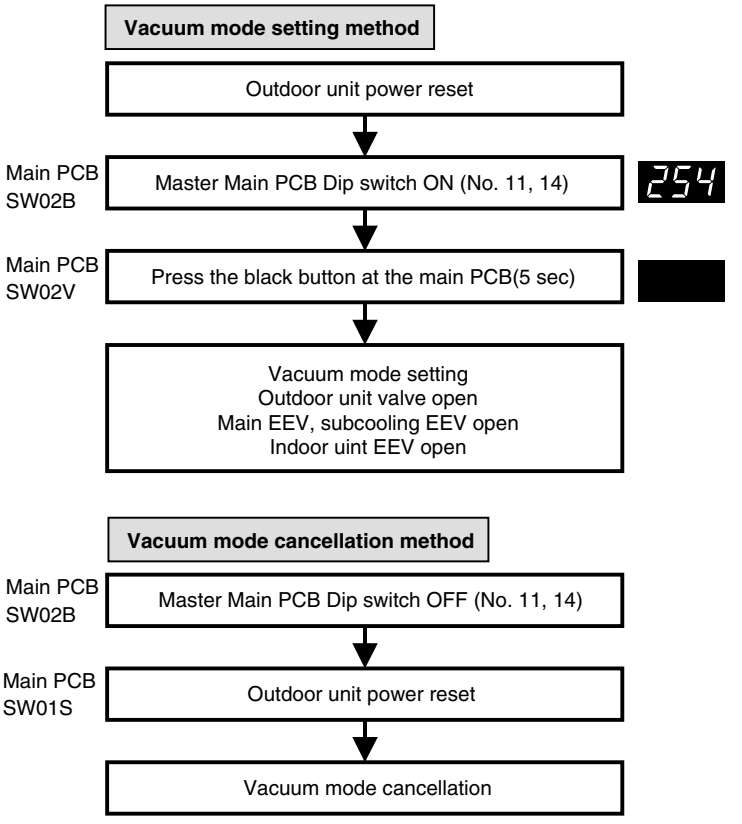
4.11 Vacuum Mode

This function is used for creating vacuum in the system after compressor replacement, outdoor unit parts replacement or indoor unit addition/replacement.


Vacuum mode setting method
Outdoor unit power reset
Main PCB SW02B
Master Main PCB Dip switch ON (No. 11, 14)
254
Main PCB SW02V
Press the black button at the main PCB(5 sec)
Vacuum mode setting
Outdoor unit valve open
Main EEV, subcooling EEV open
Indoor uint EEV open
Vacuum mode cancellation method
Main PCB SW02B
Master Main PCB Dip switch OFF (No. 11, 14)
Main PCB SW01S
Outdoor unit power reset
Vacuum mode cancellation

CAUTION

Outdoor unit operation stops during vacuum mode. Compressor can't operate.

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4.12 Black Box Function

This function saves data immediately before the error occurs in outdoor unit main PCB, and thus making error analysis cause possible.

Data loading method

Indoor unit, outdoor unit stop

↓

Press the black button (5 sec.)

↓

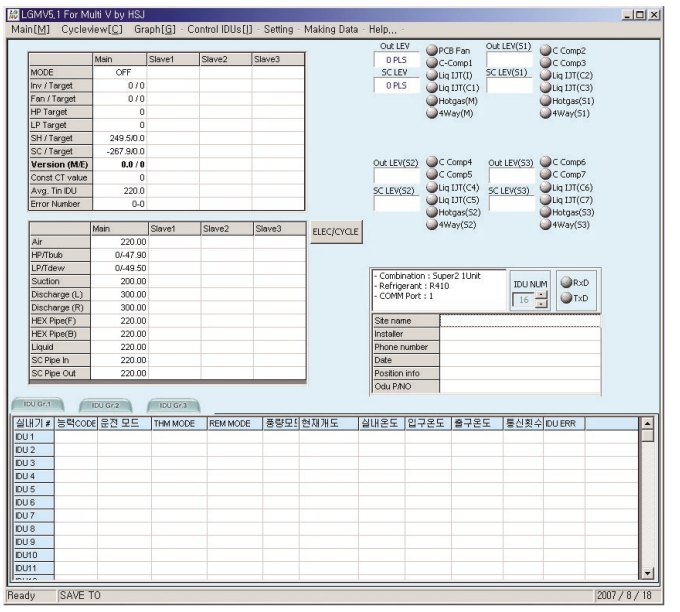
EEPROM ➠ Main micom data loading

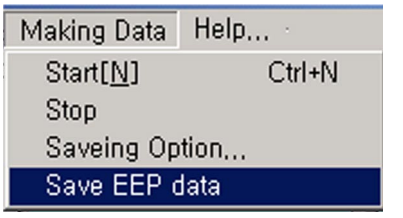
Yellow LED(LED01C) stops when data is loading
After completion, it is starts blinking (about 20 sec.).

↓

EEPROM data save to PC by using
<Save EEP data> in LGMV

■ Saving process : Making data ➠ Save EEP data ➠ Data saving place select ➠ File save





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Part 3
HR Units

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HR Units

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1. Specifications

HR Unit

Model					PRHR020	PRHR030	PRHR040
Max. Connectable No. of Indoor units					2	3	4
Nominal input	Cooling				26	40	40
	Heating				26	40	40
Net. Weight	kg				19	20	21
	lbs				44.1	48.5	52.9
Dimensions (W*H*D)	Inch				31.5*8.6*24.3	31.5*8.6*24.3	31.5*8.6*24.3
	mm				801*218*617	801*218*617	801*218*617
Casing					Galvanized steel plate		
Connecting pipe	Indoor	Liquid pipe	[mm/inch]		Ø9.52[3/8]		
		Gas pipe	[mm/inch]		Ø15.88[5/8]		
	Outdoor	Liquid	[mm/inch]		Ø9.52[3/8]	Ø12.7[1/2]	Ø12.7[7/8]
		Low pressure	[mm/inch]		Ø22.2[7/8]	Ø28.58[1 1/8]	Ø28.58[1 1/8]
		High pressure	[mm/inch]		Ø19.05[3/4]	Ø22.2[7/8]	Ø22.2[7/8]
Sound absorbing insulation material					Flame and resistant foamed polyetinylene		
Current	Minimum circuit Amps(MCA)				0.2		
	Maximum fuse Amps(MFA)				15		
Power supply					1Ø, 220~240V, 50Hz 1Ø, 220V, 60Hz		

Notes:

1. Voltage range : Units are suitable for sue on electrical systems where voltage supplied to units terminals is not below or above listed range limits.
2. Maximum allowable voltage unbalance between phases is 2%
3. MCA/MFA MCA = 1.25 * FLA
   MFA ≤ 4*FLA
   (Next lower standard fuse rating. Min. 15A)
4. Select wire size based on the MCA
5. Instead of fuse, use circuit.

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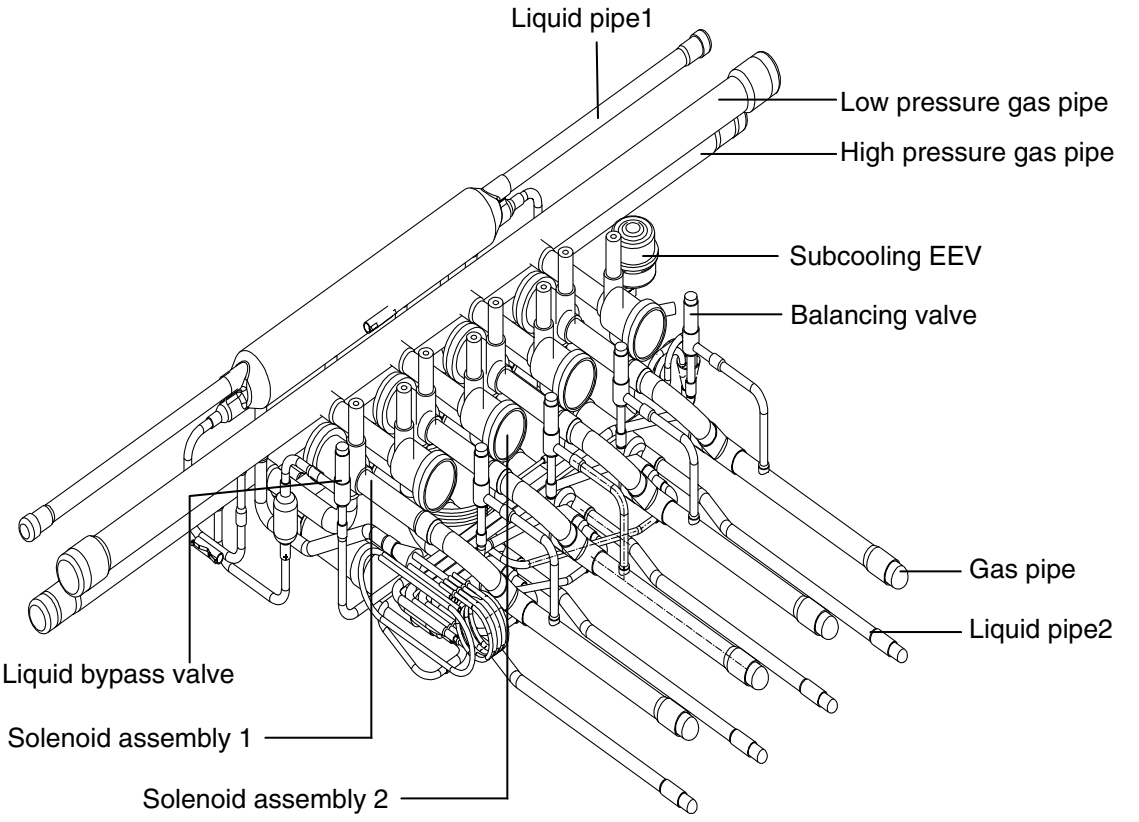
2. Parts Functions

2.1 Parts Functions

Parts name	Symbol	Major function
Low pressure gas pipe	LPGV	Pipe for low pressure gas
High pressure gas pipe	HPGV	Pipe for high pressure gas
Liquid pipe 1	LP1	Liquid pipe connected with outdoor unit
Liquid bypass valve	LBV	Prevent liquid charging
Solenoid assembly 1, 2	SOL1, 2	Control the path for heating or cooling
Liquid pipe 2	LP2	Liquid pipe connected with indoor unit
Gas pipe	GSP	Gas pipe connected with indoor unit
Balancing valve	BLV	Control the pressure between High and Low pressure pipe during operation switching
Subcooling EEV	SCEEV	Control the subcooling



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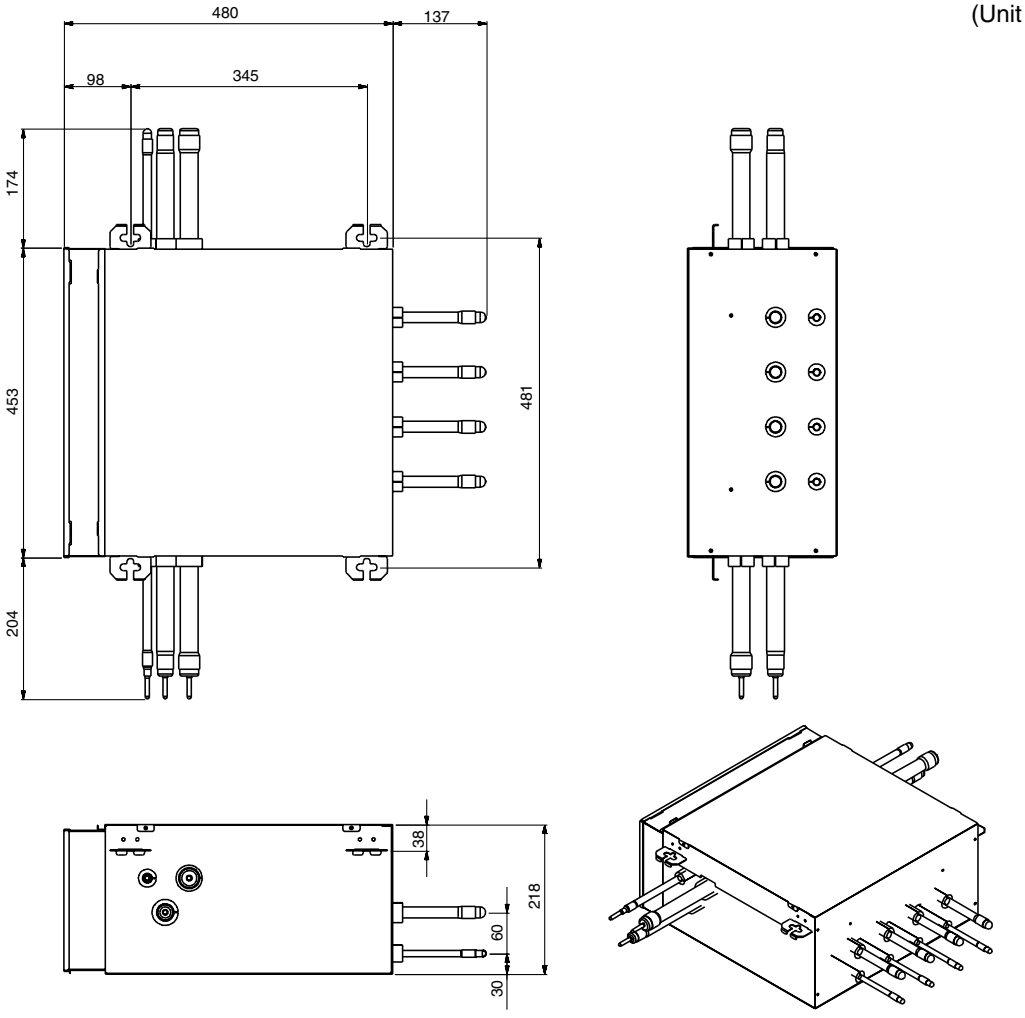
3. Dimensions

3.1 HR Units

(Unit :mm)

PRHR020
PRHR030
PRHR040



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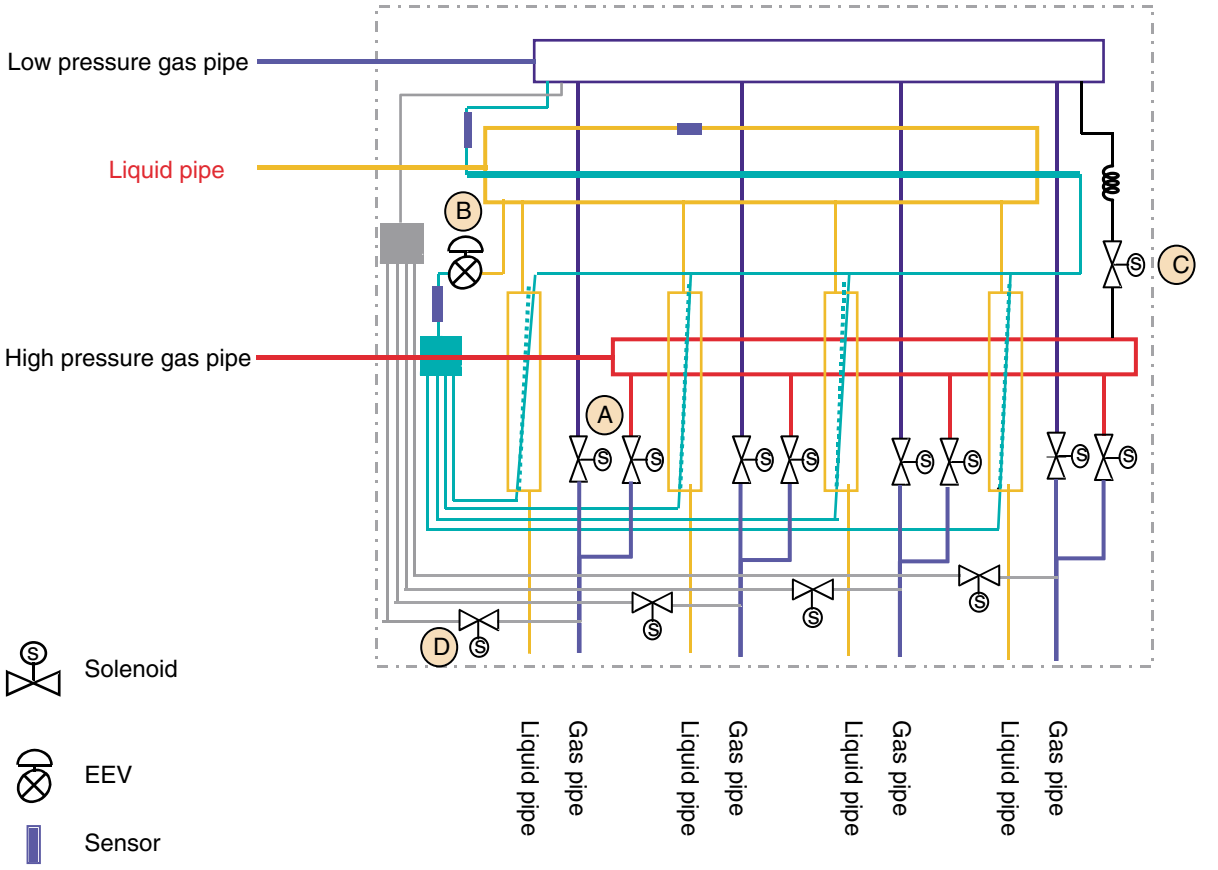
4. Piping Diagrams

4.1 HR Unit



Ⓐ : To be switched operation between cooling and heating by two Solenoid valve

Ⓑ : To be used decreasing noise according to sub-cooling of inlet and outlet of indoor unit (Simultaneous operation)

Ⓒ : To prevent liquid charging between high pressure gas valve and HR unit at cooling mode

Ⓓ : To be controlled the pressure between high and low pressure pipe during operation switching

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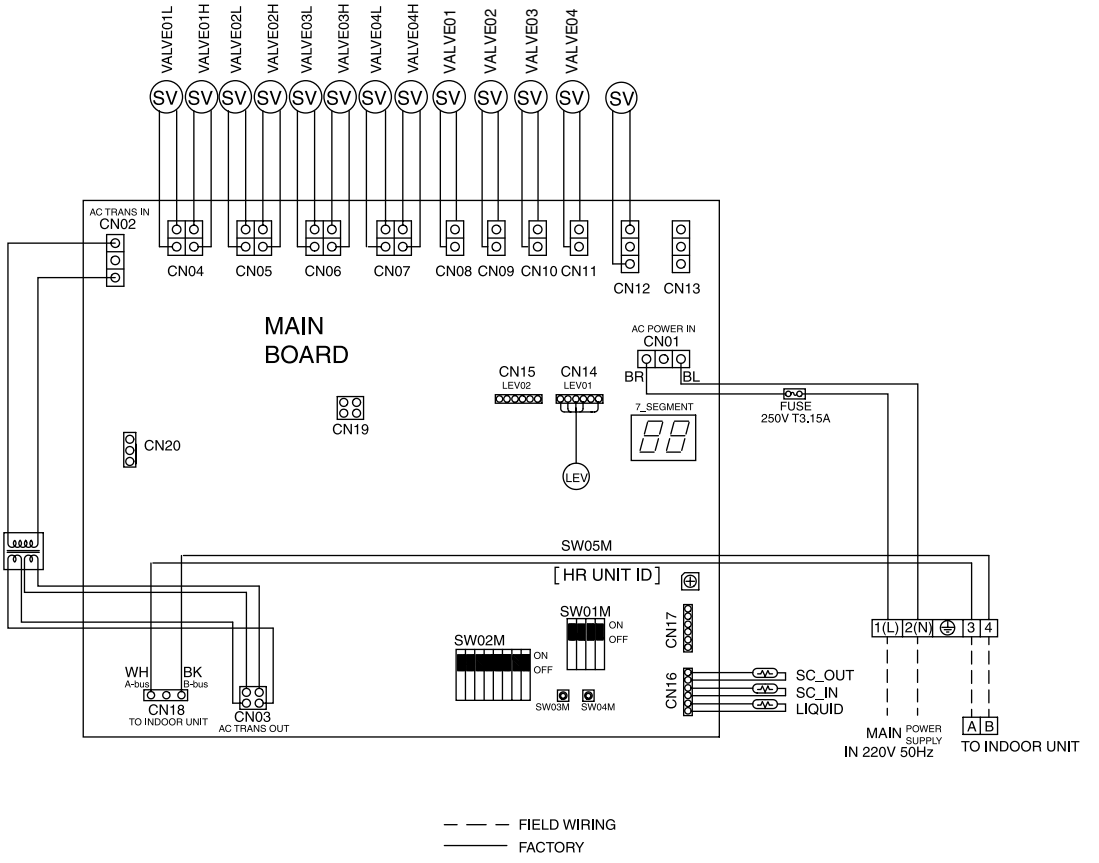
5. Wiring Diagrams

5.1 HR Units



CN04	Solenoid valve 01L/H(For room1)
CN05	Solenoid valve 02L/H(For room2)
CN06	Solenoid valve 03L/H(For room3)
CN07	Solenoid valve 04L/H(For room4)
CN08	Solenoid valve 01 (Bypass for room1)
CN09	Solenoid valve 02 (Bypass for room2)
CN10	Solenoid valve 03 (Bypass for room3)
CN11	Solenoid valve 04 (Bypass for room4)
CN12	Solenoid valve bypass
CN14	Sub cooling EEV
CN16(SC Out)	Sensor, sub cooling out
CN16(SC In)	Sensor, sub cooling in
CN18(Liquid)	Sensor, liquid receiver
SW01M	Solonoid valve number Setting(When manual address)
SW02M(1)	Selecting, auto address(↓) or manual address(↑)
SW02M(2~3)	Setting, total number of indoor connected
SW03M	Setting, the address of indoor_10(When manual address)
SW04M	Setting, the address of indoor_1(When manual address)
SW05M	Setting, HR unit number

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6. Functions

1. Basic Control

1.1 Normal Operation

Actuator	Power on	Cooling operation	Heating operation	Stop state
High pressure gas valve	Close	Close	Open	Keep
Low pressure gas valve	After 30 sec. Open	Open	Close	Keep
Liquid valve	Close	Open	Close	Close

1.2 Starting Control(Heating Mode Only)

If the system is operated in the heating mode, all high pressure gas valves are opened

1.3 Valve Control

Mode change timer is calculated as Table 1, and valves are controlled by Mode change timer according to Table 2.

Table 1. Mode change timer calculation

Previous mode	Changing mode	Mode change timer
Stop or ventilation	Cooling or heating	120 sec
Cooling mode	Heating	180 sec
Heating mode	Cooling	120 sec
Cooling or heating	Stop or ventilation	During heating : 60 sec During cooling : 0 sec

Table 2. Valve control by mode change timer

Operating mode	Mode change timer	H/P gas valve	L/P gas valve	Balancing valve
Cooling	120 ≤ timer	Keep	Keep	Close
	0 < timer < 120	Close	Close	Open
	timer = 0	Close	Open	Close
Heating	180 ≤ timer	Keep	Keep	Close
	0 < timer < 180	Close	Close	Close
	timer = 0	Open	Close	Close
Stop or ventilation	0 < timer ≤ 5	Cooling mode : Close	Keep	Close
	Timer = 0	Heating mode : Low pressure gas valve ➠ Close	Keep	Close

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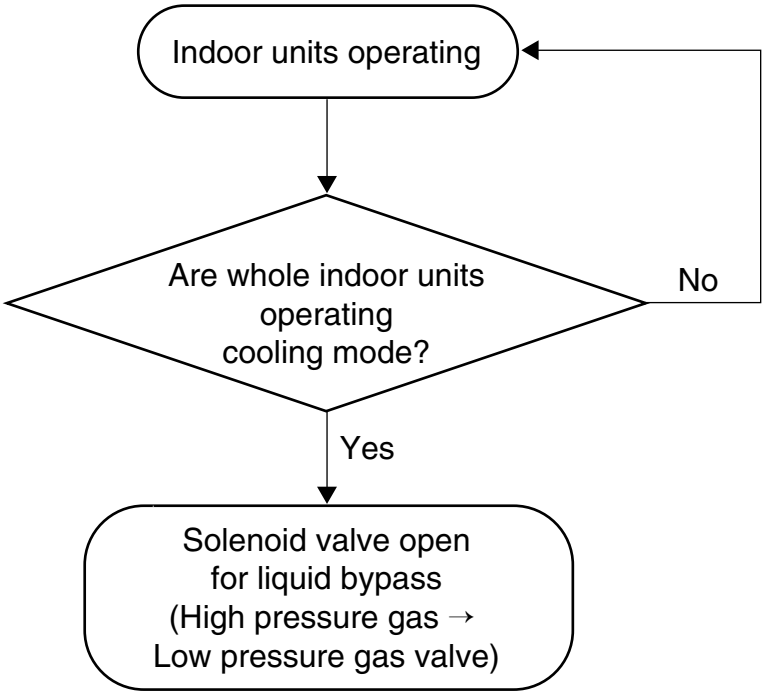
2. Special Control

2.1 Oil Return/Defrost Control

Component	Starting	Running	Ending
Inverter compressor	Stop	60 Hz	40 Hz
High pressure gas valve	Keep	Close	Open or Close
Low pressure gas valve	Keep	Open	Open or Close
Balancing valve	Open for 30s	Close	Close

2.2 Liquid Bypass Control


Indoor units operating
Are whole indoor units operating cooling mode?
No
Yes
Solenoid valve open for liquid bypass (High pressure gas → Low pressure gas valve)

2.3 Subcooling EEV Control

Target : about 15°C

Subcooling EEV works with Fuzzy rules to keep the degree of subcooling at the outlet of subcooler during simultaneous operation

The degree of subcooler = T outlet of subcooler – T inlet of subcooler

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Part 4
PCB Setting and Test Run

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PCB Setting and Test Run

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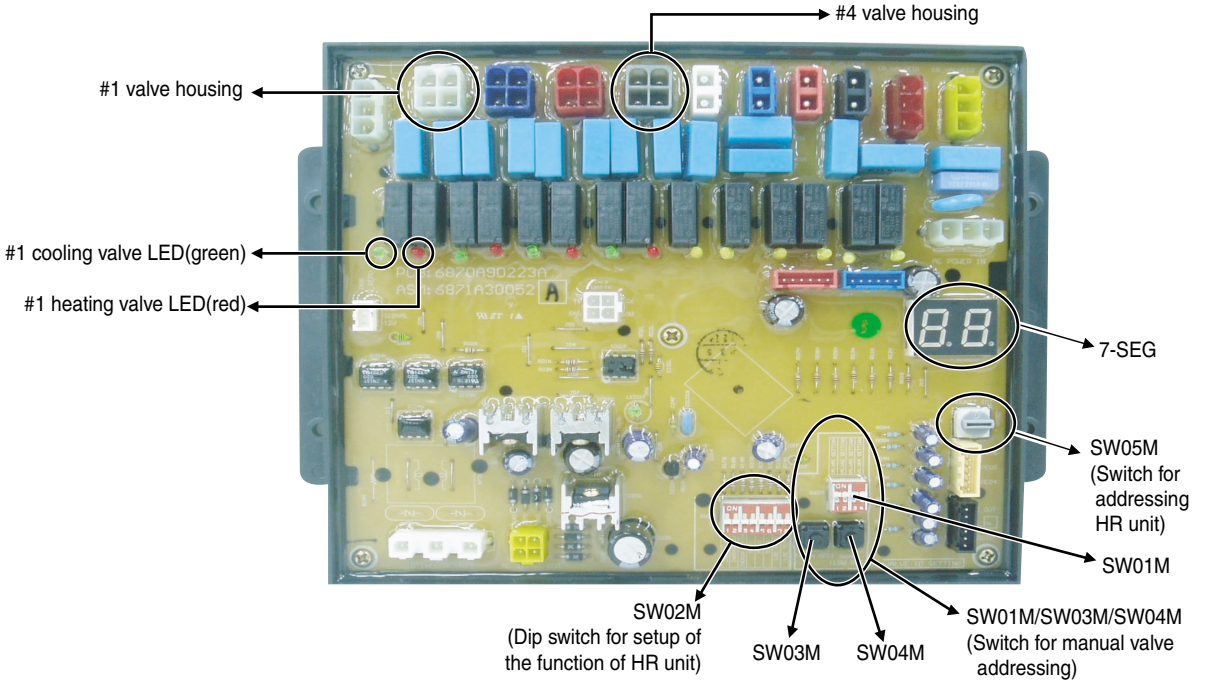
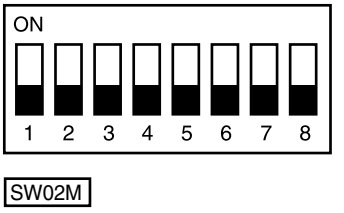
HR Unit PCB



1. Switch for Setup of HR Unit

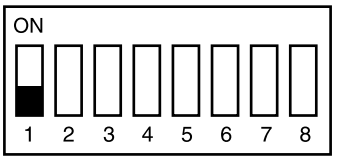
1. Main function of SW02M

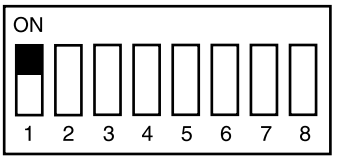


SW02M

ON switch	Selection
No.1	Method for addressing valves of an HR unit (Auto/Manual)
No.2	Model of HR unit
No.3	Model of HR unit
No.4	Valve group setting
No.5	Valve group setting
No.6	Valve group setting
No.7	Use only in factory production (preset to “OFF”)
No.8	Use only in factory production (preset to “OFF”)

1) Selection of the method for addressing valves of an HR unit (Auto/Manual)





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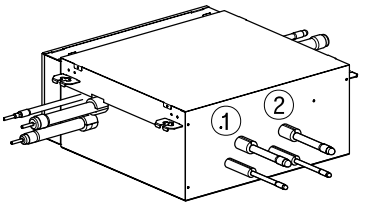
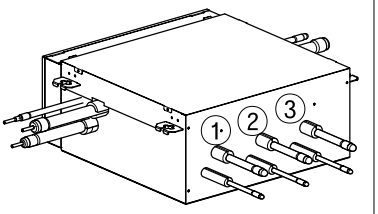
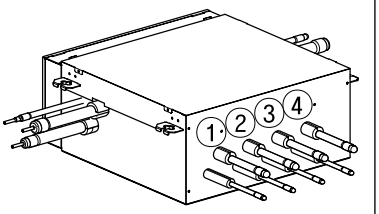
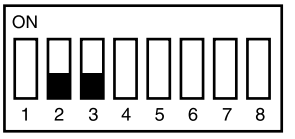
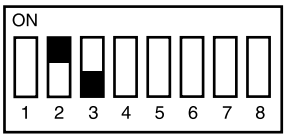
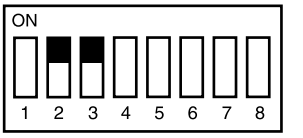
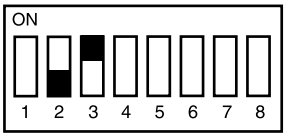
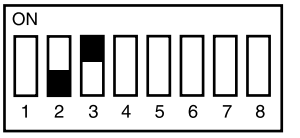
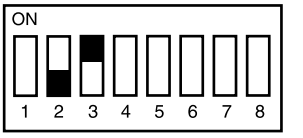
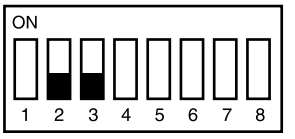
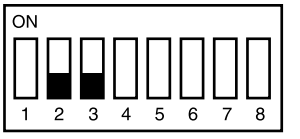
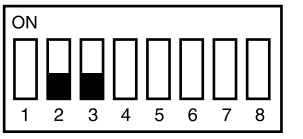
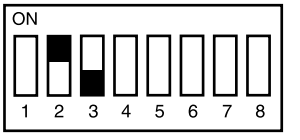
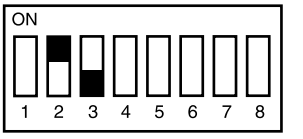
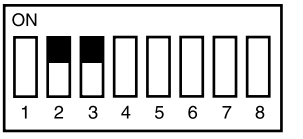
2) Selection of the model of the HR unit

	 (For 2 rooms) PRHR020	 (For 3 rooms) PRHR040	 (For 4 rooms) PRHR040
Initial setting			
1 room connected			
2 rooms connected			
3 rooms connected			
4 rooms connected			

❉ Each model is shipped with the switches No.2 and No.3 pre-adjusted as above in the factory.

WARNING

If you want to use a PRHR030 for 2 rooms HR unit after closing the 3rd pipes, set the dip switch for 2 rooms HR unit.
If you want to use a PRHR040 for 3 rooms HR unit after closing the 4th pipes, set the dip switch for 3 rooms HR unit.
If you want to use a PRHR040 for 2 rooms HR unit after closing the 3rd and 4th pipes, set the dip switch for 2 rooms HR unit.
The unused port must be closed with a copper cap, not with a plastic cap.

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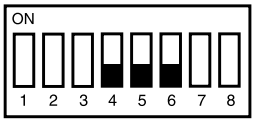
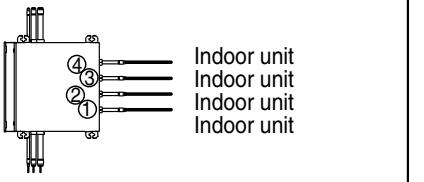
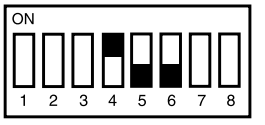
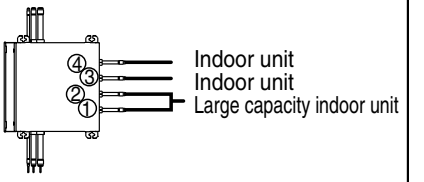
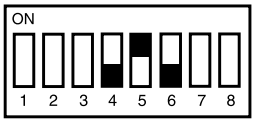
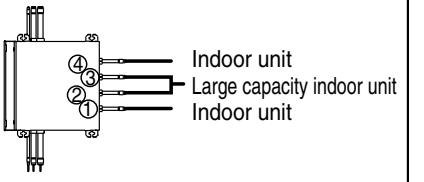
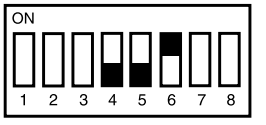
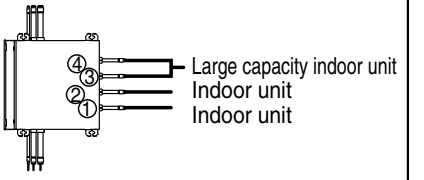
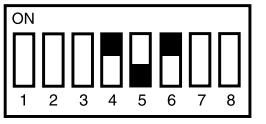
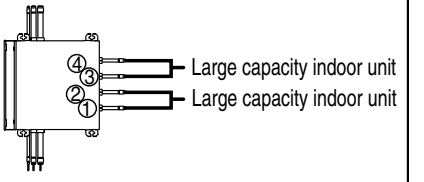
3) Setting the Valve group.

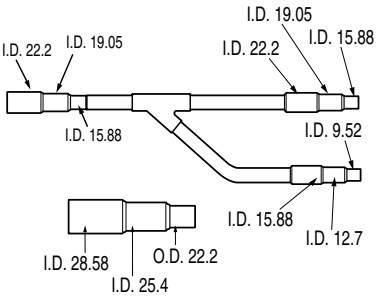
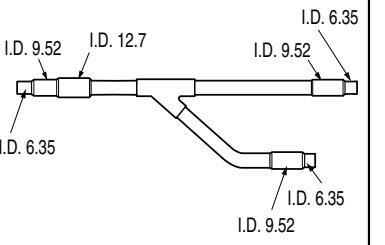
	Dip switch setting	Example
Not control		
No.1, 2 valve control		
No.2, 3 valve control		
No.3, 4 valve control		
No.1, 2 valve / No.3, 4 valve control		

Note:

If the large capacity indoor units are installed, below Y branch pipe should be used

✻ Y branch pipe

[Unit:mm]

Models	Gas pipe	Liquid pipe
ARBLB03320		

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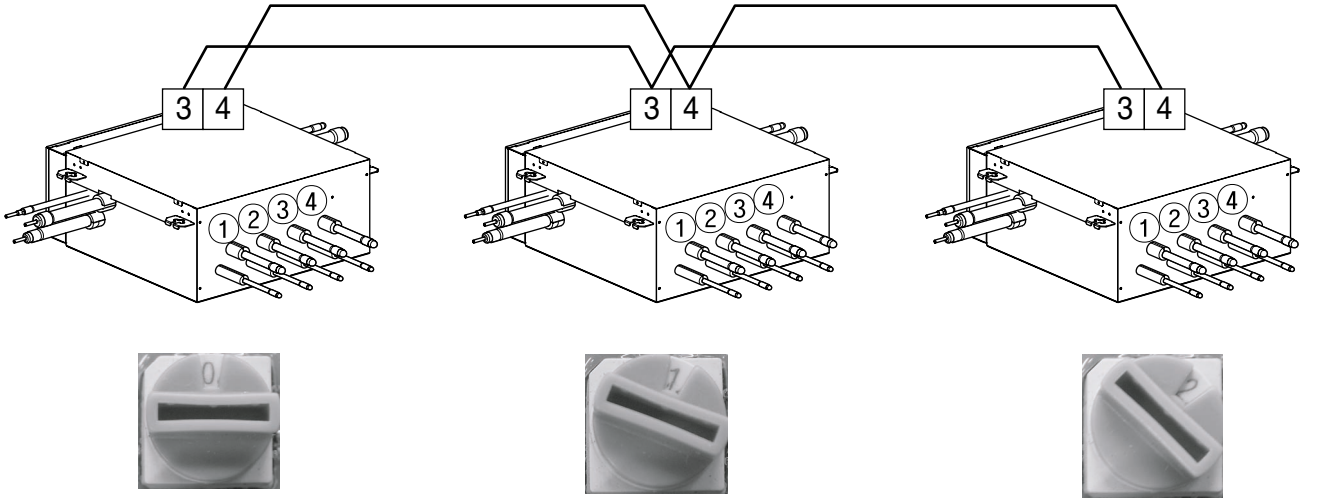
2. SW05M (Rotary switch for addressing HR unit)

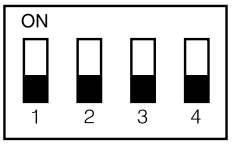
Must be set to '0' when installing only one HR unit.
When installing multiple HR units, address the HR units with sequentially increasing numbers starting from '0'.

Ex) Installation of 3 HR units



3. SW01M/SW03M/SW04M (Dip switch and tact switch for manual valve addressing)

- Used in manual addressing of the valve in the HR unit
- Set the address of the valve of the HR unit to the central control address of the connected indoor unit.
- SW01M: selection of the valve to address
  SW03M: increase in the digit of 10 of valve address
  SW04M: increase in the last digit of valve address
- Prerequisite for manual valve addressing : central control address of each indoor unit must be preset differently at its wired remote control.

	Switch No.	Setup
 SW01M	No.1	Manual addressing of valve #1
	No.2	Manual addressing of valve #2
	No.3	Manual addressing of valve #3
	No.4	Manual addressing of valve #4
SW03M	SW03M	Increase in the digit of 10 of valve address
SW04M	SW04M	Increase in the last digit of valve address

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2. Method for Addressing of Indoor and HR Unit

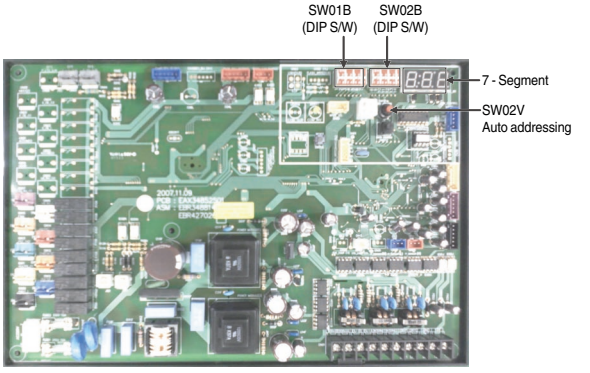
1) Auto addressing for indoor unit

2) Auto pipe detection

3) Manual pipe detection(Execute in case of auto pipe detection failure)

• Turn off all the indoor units before auto addressing.
If indoor unit is operated, auto addressing would not be completed.

1) Auto addressing for indoor unit



① Wait 3 minutes after turning on the outdoor unit, HR unit, indoor unit.

② Press SW02V of the outdoor unit main PCB for 5 seconds

③ 2~7 minutes are required depending on the number of indoor units connected.

④ The number of the indoor units and HR units connected is displayed at 7-SEG of the outdoor unit main PCB after completion of indoor unit addressing and the address of each indoor unit appears in the window of its own wired remote control. (Example: CH01, CH02, CH03....CH06)

⑤ Indoor unit auto addressing is completed

2) Auto pipe detection

• Turn No.1 of SW02M of HR unit PCB off.

• Confirm that the setting of No.2, 3 of SW02M corresponds with the number of indoor units.

• Reset the power of HR unit PCB

• Turn off the No.5 dip switch of outdoor PCB when outdoor temperature is below 15°C

• Turn on the No.5 dip switch of outdoor PCB when outdoor temperature is over 15°C

• Reset the power of outdoor unit.

• Wait 3 minuts.

• Press SW01V of the outdoor unit main PCB for 5 seconds.

• The number of connected HR unit is displayed.
Ex) In case of installing four HR units : 04

• Operated after 88 is displayed on 7-SEG of the outdoor unit main PCB.

• Pipe detection proceed.

• 5~30 minutes are required depending on the number of the indoor units and outdoor temperature.

• The number of the indoor units installed is displayed on 7-SEG of the outdoor unit main PCB for about 1 minute
(For a HR unit, the number of the indoor units connected to each HR unit is displayed.

• '200' is displayed in case of auto pipe detection error, and auto detection is completed after '88' is disappeared.

❉ Auto pipe detection function : the function that sets connection relationship automatically between the indoor unit and HR unit.

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WARNING

1. Execute auto addressing and auto pipe detection again whenever the indoor PCB and HR unit PCB is replaced.
• Operation error occurs unless power is applied to the indoor and HR units.
2. Error No.200 occurs if the number of connected indoor units and that of scanned indoor units are different.
3. When auto pipe detection fails, complete it with manual pipe detection (See manual pipe detection).
4. When auto pipe detection addressing is completed normally, manual pipe detection is not required.
5. If you want to do auto pipe detection again after auto pipe detection fails, do after reset of outdoor unit by all means.

3) Manual pipe detection

- Enter the central control address into each indoor unit using its wired remote control.
- Turn No.1 of SW02M of HR unit PCB on.
- Reset the power of HR unit PCB.
- On the HR unit PCB, manually set address of each valve of the HR unit to the central control address of the indoor unit connected to the valve.
- Turn No.6 of SW03M of outdoor unit PCB on.
- Reset the power of outdoor unit PCB.
- The number of the indoor unit installed is displayed after about 5 minutes.
  ex) Ex) HR ➠ The number of the indoor
- Turn No.6 of SW03M of outdoor unit PCB off.
- Reset the power of outdoor unit PCB.
- Manual pipe detection is completed

WARNING

• In case that central controller is not installed, remain the address data after installer sets central control address as he wants
• In case that central controller is installed, there would be central control address in wired remote control of indoor unit.
• In this case, set the HR unit manual pipe address according to central control address of indoor unit.
• Pipe which is not connected with indoor unit should be set different address with pipe connected with indoor unit.
(If addresses are piled up, corresponding valve is not working.
• If you want to change the setting of manual pipe, you should do it on HR unit PCB.
• If an error occurred, it means that manual pipe setting is not completed.

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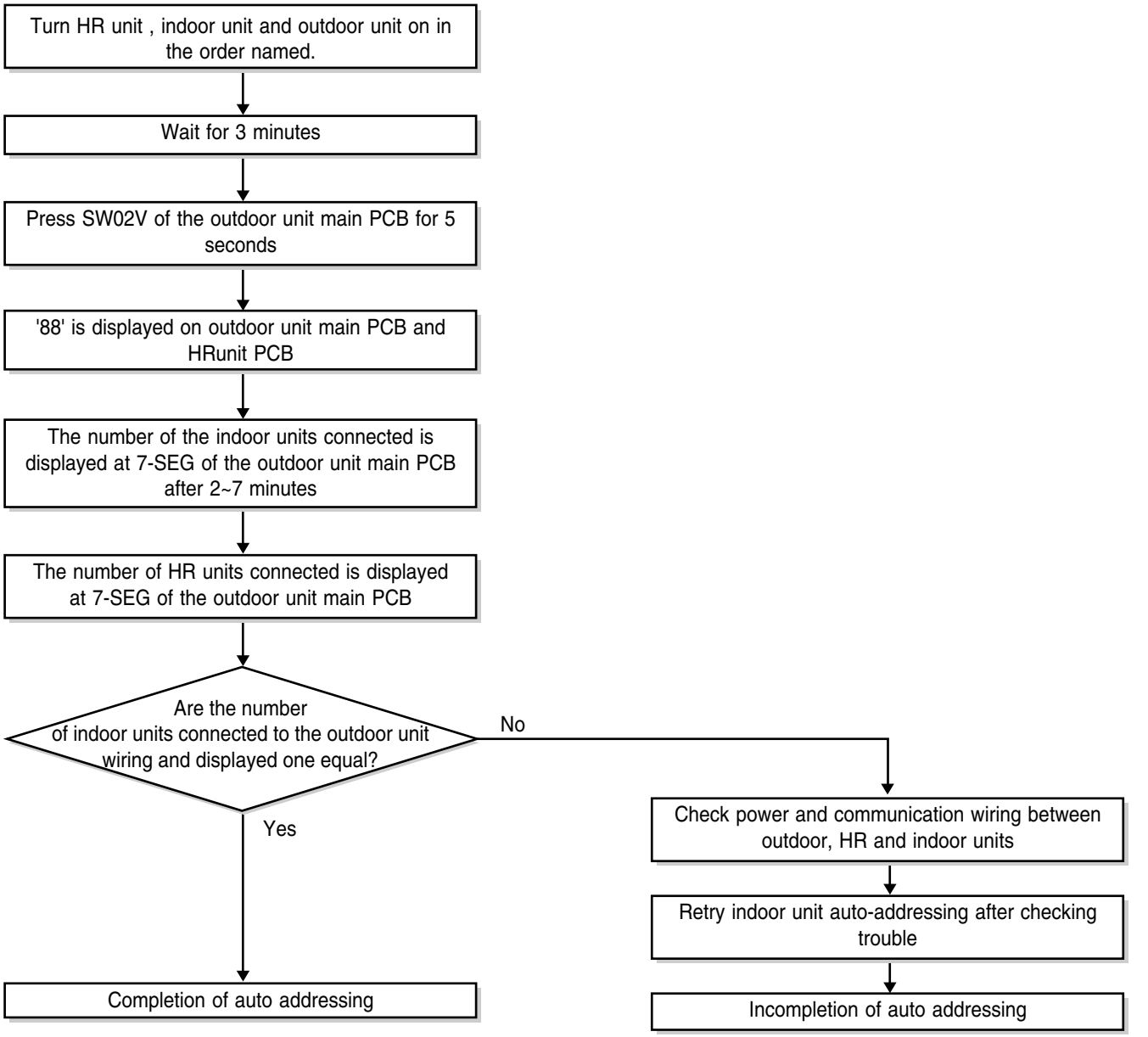
3. Flow chart for Chart for Auto-Addressing of Indoor and HR Unit

1) Flow chart for auto addressing


Turn HR unit , indoor unit and outdoor unit on in the order named.
Wait for 3 minutes
Press SW02V of the outdoor unit main PCB for 5 seconds
'88' is displayed on outdoor unit main PCB and HRunit PCB
The number of the indoor units connected is displayed at 7-SEG of the outdoor unit main PCB after 2~7 minutes
The number of HR units connected is displayed at 7-SEG of the outdoor unit main PCB
Are the number of indoor units connected to the outdoor unit wiring and displayed one equal?
No
Yes
Check power and communication wiring between outdoor, HR and indoor units
Retry indoor unit auto-addressing after checking trouble
Incompletion of auto addressing
Completion of auto addressing

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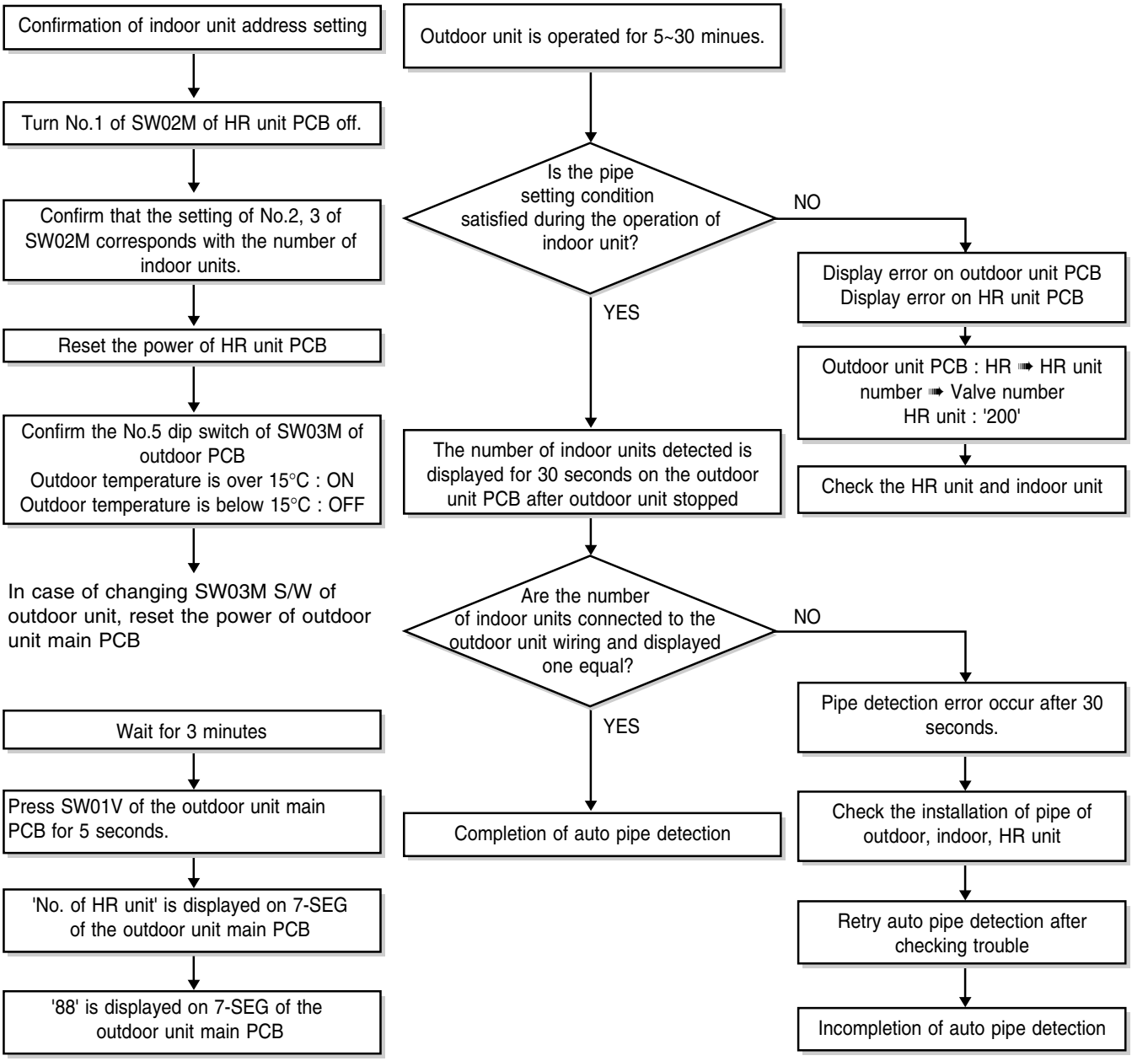
2) Flow chart for auto pipe detection


Confirmation of indoor unit address setting
Turn No.1 of SW02M of HR unit PCB off.
Confirm that the setting of No.2, 3 of SW02M corresponds with the number of indoor units.
Reset the power of HR unit PCB
Confirm the No.5 dip switch of SW03M of outdoor PCB
Outdoor temperature is over 15°C : ON
Outdoor temperature is below 15°C : OFF
In case of changing SW03M S/W of outdoor unit, reset the power of outdoor unit main PCB
Wait for 3 minutes
Press SW01V of the outdoor unit main PCB for 5 seconds.
'No. of HR unit' is displayed on 7-SEG of the outdoor unit main PCB
'88' is displayed on 7-SEG of the outdoor unit main PCB
Outdoor unit is operated for 5~30 minues.
Is the pipe setting condition satisfied during the operation of indoor unit?
NO
YES
Display error on outdoor unit PCB
Display error on HR unit PCB
Outdoor unit PCB : HR ➠ HR unit number ➠ Valve number
HR unit : '200'
Check the HR unit and indoor unit
The number of indoor units detected is displayed for 30 seconds on the outdoor unit PCB after outdoor unit stopped
Are the number of indoor units connected to the outdoor unit wiring and displayed one equal?
NO
YES
Pipe detection error occur after 30 seconds.
Check the installation of pipe of outdoor, indoor, HR unit
Retry auto pipe detection after checking trouble
Incompletion of auto pipe detection
Completion of auto pipe detection

※ It is possible to be generated mode changing noise of heating and cooling which is normal.
There is no mode changing noise at normal operation.

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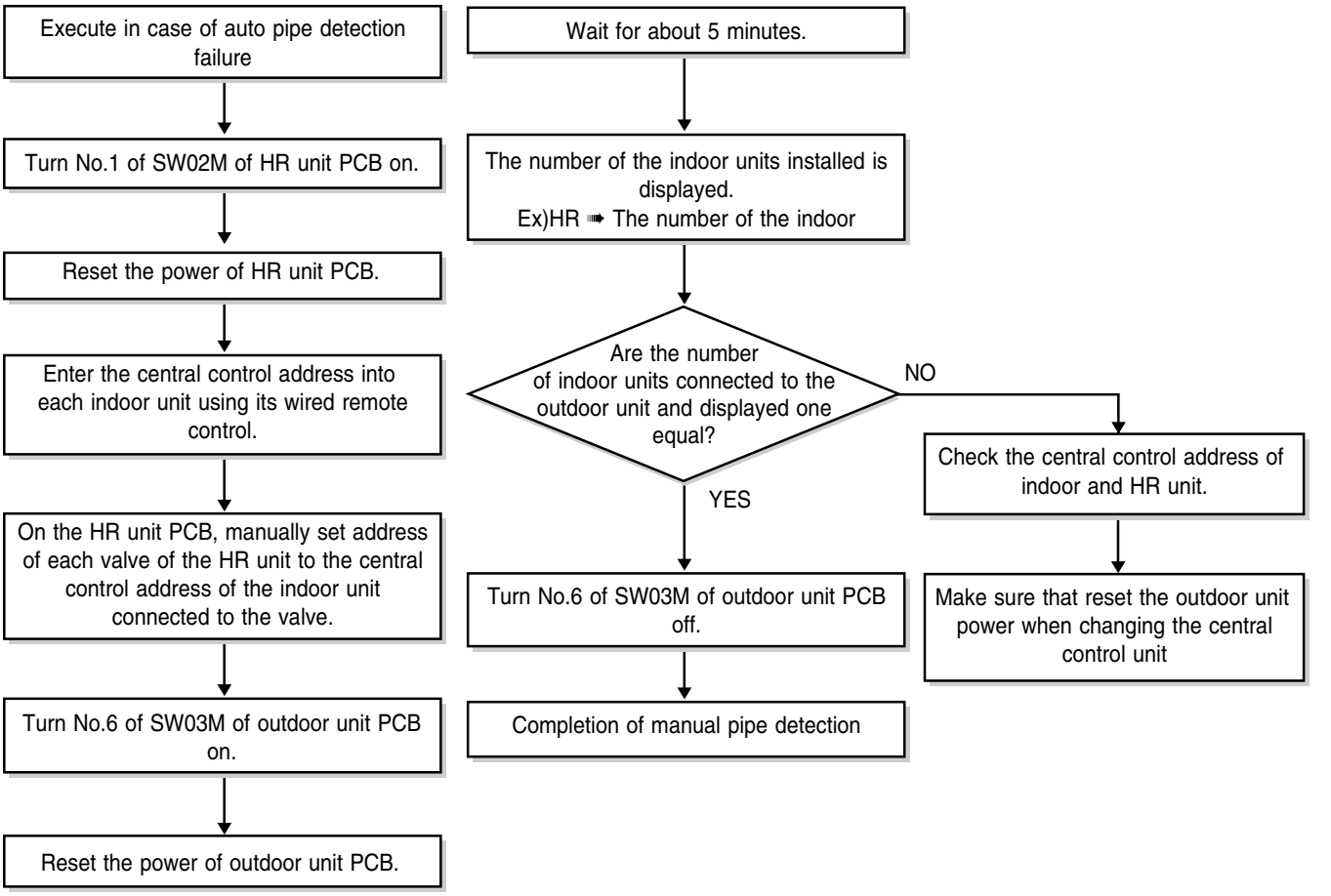
3) Flow chart for manual pipe detection


Execute in case of auto pipe detection failure
Turn No.1 of SW02M of HR unit PCB on.
Reset the power of HR unit PCB.
Enter the central control address into each indoor unit using its wired remote control.
On the HR unit PCB, manually set address of each valve of the HR unit to the central control address of the indoor unit connected to the valve.
Turn No.6 of SW03M of outdoor unit PCB on.
Reset the power of outdoor unit PCB.
Wait for about 5 minutes.
The number of the indoor units installed is displayed.
Ex)HR ➠ The number of the indoor
Are the number of indoor units connected to the outdoor unit and displayed one equal?
NO
YES
Check the central control address of indoor and HR unit.
Make sure that reset the outdoor unit power when changing the central control unit
Turn No.6 of SW03M of outdoor unit PCB off.
Completion of manual pipe detection

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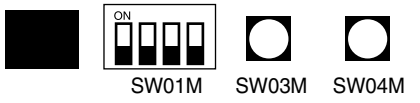
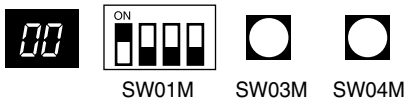
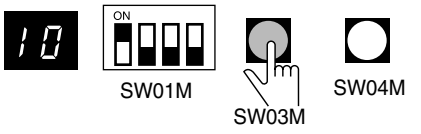
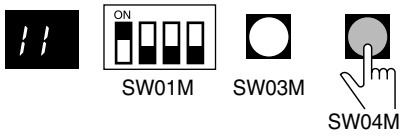
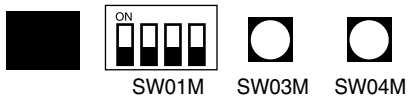
4. Example of Manual Valve Addressing

(In case that an indoor unit of central control address "11" is connected to a valve #1 of an HR unit)

• Prerequisite for manual valve addressing: central control address of each indoor unit must be preset differently at its wired remote control

No.	Display and setup	Setup and contents
1		• Operation: None • Display: None
2		• Operation: Turn No.1 of SW01M on to address valve #1 • Display: Existing value saved in EEPROM is displayed in 7-SEG.
3		• Operation: Set the digit of 10 to the number in group high data of the wired remote control connected to the corresponding indoor unit to the valve #1 by pressing SW03M. • Display: Digit increasing with the times of pressing tack switch is displayed in left 7-SEG
4		• Operation: Set the digit of 1 to the number in group low data of the wired remote control connected to the corresponding indoor unit to the valve #1 by pressing SW04M. • Display: Digit increasing with the times of pressing tack switch is displayed in right 7-SEG
5		• Operation: Turn No.1 of SW01M off to save the address of valve #1 • Display: "11" displayed in 7-SEG disappears

- Above setup must be done for all HR unit valves.
- The valve that is not connected with any indoor unit should be addressed with any other number than used address numbers of the valves connected with indoor units.
  (The valves does not work if the address numbers are same.)

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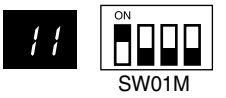
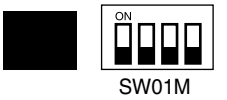
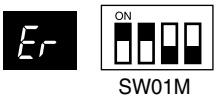
5. Example of Checking Valve Address

(In case that an indoor unit of central control address "11" is connected to a valve #1 of an HR unit)

No.	Display and setup	Setup and contents
1		• Operation: Turn dip switch No.1 on. • Display: "11" is displayed in 7-SEG
2		• Operation: Turn dip switch No.1 on. • 7-SEG disappeared

6. Identification of Manual Valve ID (Address)

No.	Display and setup	Setup and contents
1		• Operation: more than 2 dip switches turned on. • Display: "Er" is displayed in 7-SEG

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Test Run

1. Checks Before Test Run

1	Check to see whether there is any refrigerant leakage, and slack of power or transmission cable.
2	Confirm that 500 V megger shows 2.0 MΩ or more between power supply terminal block and ground. Do not operate in the case of 2.0 MΩ or less. NOTE: Never carry out megaohm check over terminal control board. Otherwise the control board would be broken. Immediately after mounting the unit or after leaving it turned off for an extended length of time, the resistance of the insulation between the power supply terminal board and the ground may decrease to approx. 2 MΩ as a result of refrigerant accumulating in the internal compressor. If the insulation resistance is less than 2 MΩ, turning on the main power supply and energizing the crankcase heater for more than 6 hours will cause the refrigerant to evaporate, increasing the insulation resistance.
3	Check if high/low pressure common pipe, liquid pipe and gas pipe valves are fully opened. NOTE: Be sure to tighten caps.
4	Check if there are any problems in automatic addressing or not: Check and confirm that there are no error messages in the display of indoor units or remote controls and LED in outdoor units.

CAUTION

When cutting main power of the Multi V

- **Always apply main power of the outdoor unit during use of product (cooling season/heating season).**
- **Always apply power before 6 hours to heat the crank case heater where performing test run after installation of product. It may result in burning out of the compressor if not preheating the crank case with the electrical heater for more than 6 hours.(In case of the outdoor temperature below 10°C)**
- **When operating t he unit after powering off, automatically run into in the preheat mode for 3 hours and "PH" is indicated on the outdoor unit 7-Segment.**

CAUTION

Preheat of compressor

- **Start preheat operation for 3 hours after supplying main power.**
- **In case that the outdoor temperature is low, be sure to supply power 6 hours before operation so that the heater is heated(insufficient heating may cause damage of the compressor.)**

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2. How to Cope with Test Run Abnormality

The phenomena from main component failure

Component	Phenomenon	Cause	Check method and trouble shooting
Compressor	Not operating	Motor insulation broken	Check resistance between terminals and chassis
		Strainer clogged	Change strainer
		Oil leakage	Check oil amount after opening oil port
	Stop during running	Motor insulation failure	Check resistance between terminals and chassis
	Abnormal noise during running	R-S-T misconnection	Check compressor R-S-T connection
Outdoor fan	High pressure error at cooling	Motor failure, bad ventilation around outdoor heat exchanger	Check the outdoor fan operation after being turned the outdoor units off for some time. Remove obstacles around the outdoor units
Outdoor EEV	Heating failure, frequent defrosting	Bad connector contact	Check connector
	No operating sound at applying power	Coil failure	Check resistance between terminals
	Heating failure, frozen outdoor heat exchanger part	EEV clogged	Service necessary
	Low pressure error or discharge temperature error	EEV clogged	Service necessary

When system fault occurs, the error code is displayed at indoor unit display or remote control display, the trouble shooting guide is in the service manual

• When CH05/53/11 ERROR occurs, check if auto-addressing has done and communication wiring is ok.

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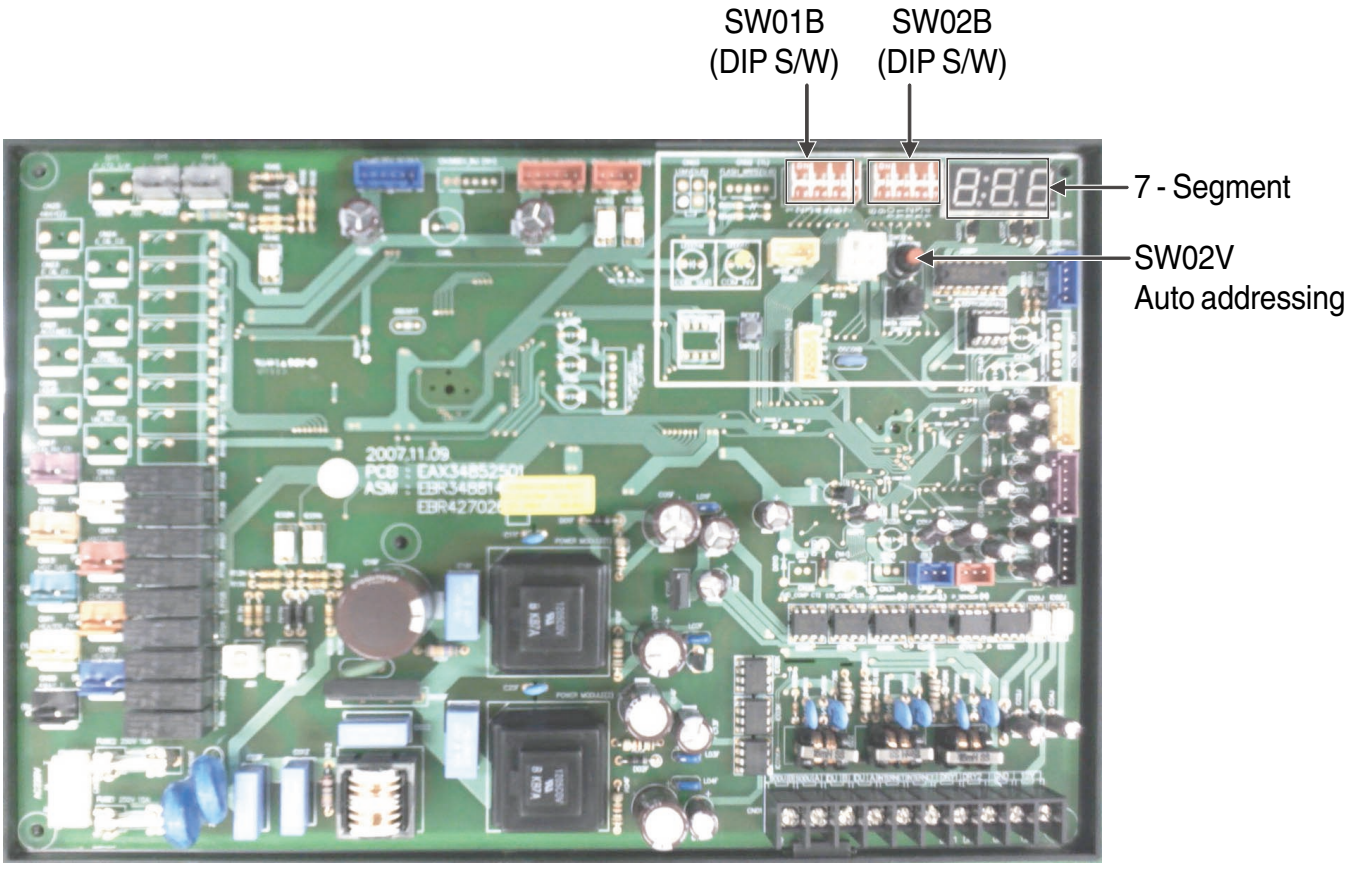
3. Dip Switch Setting

3.1 Location of setting switch

Main PCB



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4. Dip Switch Setting

■ Checking according to dip switch setting

1. You can check the setting values of the main outdoor unit from the 7 segment LED.
   The dip switch setting should be changed when the power is OFF.
2. It checks whether the input is properly performed without the bad contact of the dip switch or not

■ Checking the setting of the master unit

The number is sequentially appeared at the 7 segment in
5 seconds after applying the power. This number represents
the setting condition.

<For example, R410A 3 units>
Master model code ➔ Slave1 model code ➔ Slave 2 model code ➔ Total capacity ➔ 3 ➔ 25 ➔ 180

1 ~255 : Master model code
1 ~255 : Slave1 model code
1 ~255 : Slave2 model code
8~48HP : HP number(sum of main capacity and sub capacity)
No display : Cooling only 2 : Heat pump 3 : Heat recovery
25 : Normal
110 : Tropical 150 : R410A normal 170 : Space II 180 : Sync II

CAUTION

Product may not properly operate if the relevant dip switch is not properly setup.

Model code

Model code	Unit (HP)	Unit	Ref.
190	8	Master or slave	R410A
191	10		
192	12		
193	14		
194	16		

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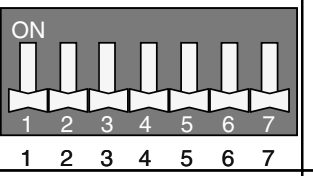
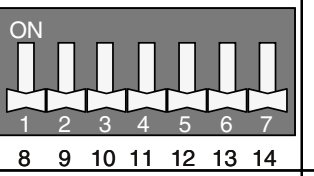
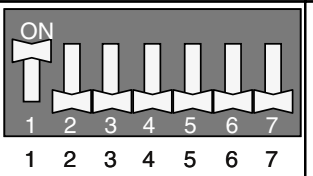
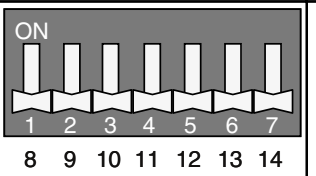
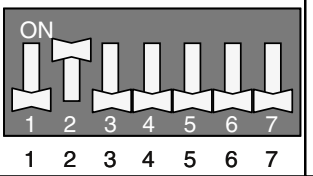
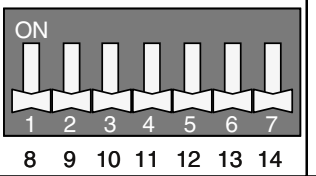
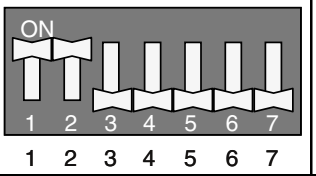
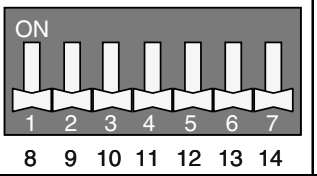
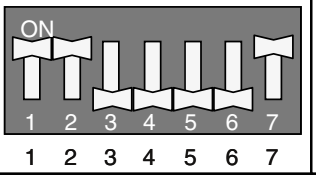
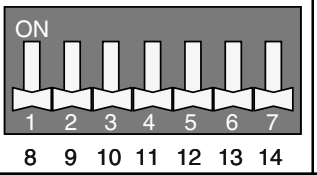
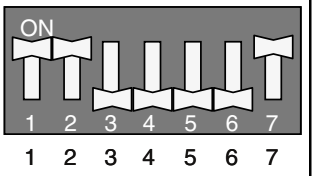
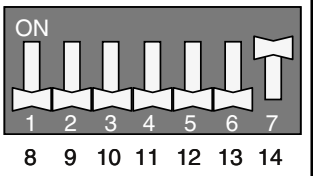
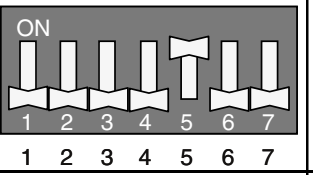
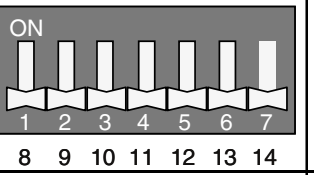
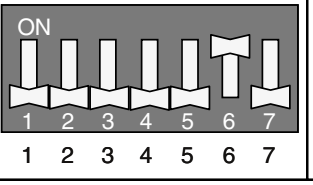
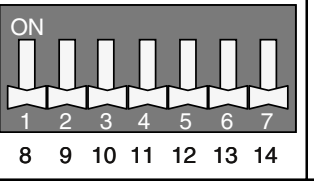
■ Setting the dip switch (SW03M)

- Set the dip switch with the power turned off. If you change the setting when the power is on, the changed setting is not applied immediately. The changed setting is applied at the moment that the power is on.
- Instant indoor unit checking, data display mode, and forced oil collecting operation are used when theunits are running. If you don't have to use those functions after using them, restore the dip switch setting.

1. Settings of main outdoor unit

Function	SW01B setting	SW02B setting	Remarks
Standard			
Short pipe length			
Long pipe length			
Longest pipe length			
Refrigerant auto charging			
Refrigerant checking			
Indoor unit forced operation (Cooling)			
Indoor unit forced operation (Heating)			

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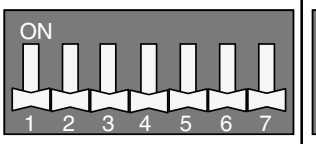
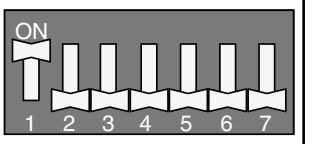
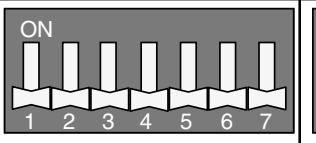
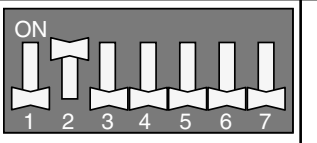
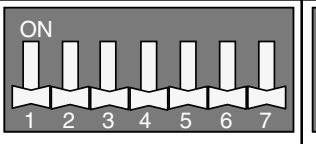
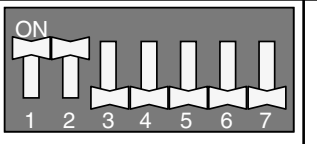
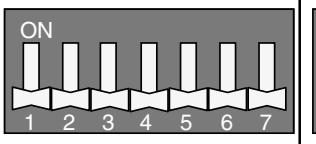
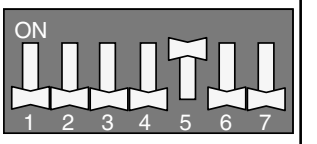
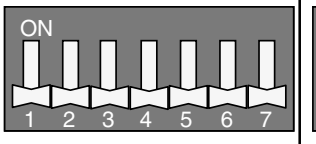
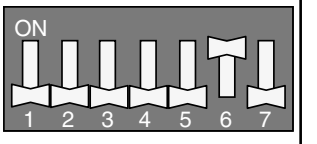
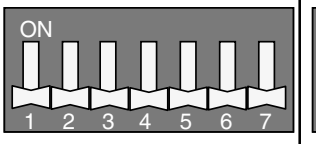
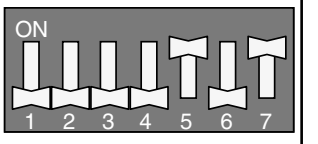
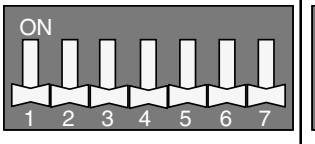
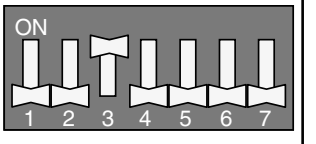
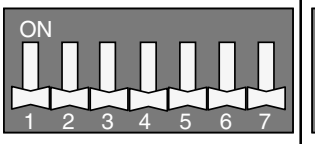
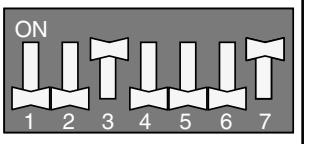
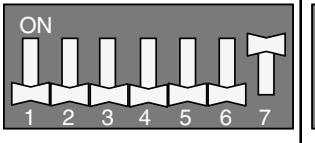
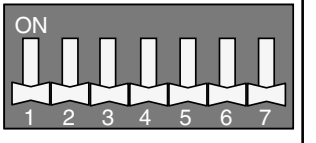
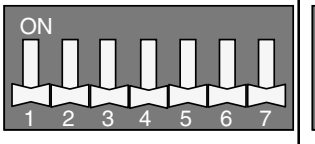
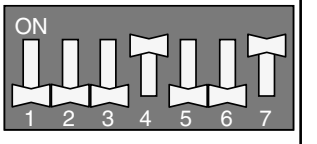
Function	SW01B setting	SW02B setting	Remarks
Snow	 1 2 3 4 5 6 7	 8 9 10 11 12 13 14	
Forced defrosting	 1 2 3 4 5 6 7	 8 9 10 11 12 13 14	
Snow + Forced defrosting	 1 2 3 4 5 6 7	 8 9 10 11 12 13 14	
Outdoor unit fan low static pressure compensation	 1 2 3 4 5 6 7	 8 9 10 11 12 13 14	
Outdoor unit fan high static pressure compensation	 1 2 3 4 5 6 7	 8 9 10 11 12 13 14	
Night low noise	 1 2 3 4 5 6 7	 8 9 10 11 12 13 14	
Pump down	 1 2 3 4 5 6 7	 8 9 10 11 12 13 14	
Pump out	 1 2 3 4 5 6 7	 8 9 10 11 12 13 14	
Forced oil return	 1 2 3 4 5 6 7	 8 9 10 11 12 13 14	
Vacuum mode	 1 2 3 4 5 6 7	 8 9 10 11 12 13 14	

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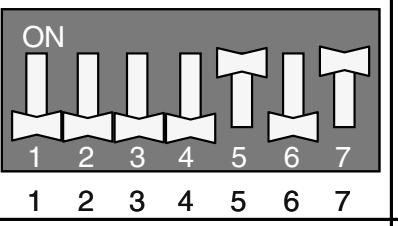
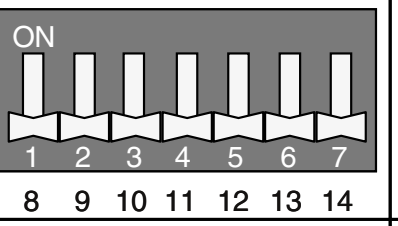
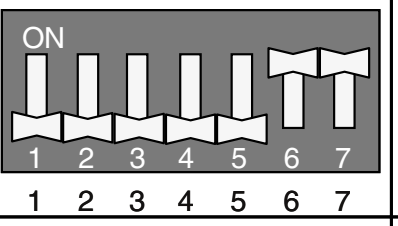
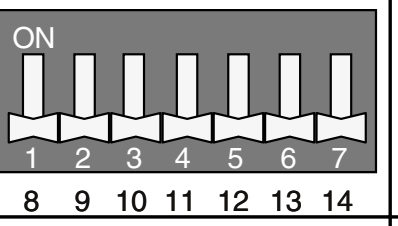
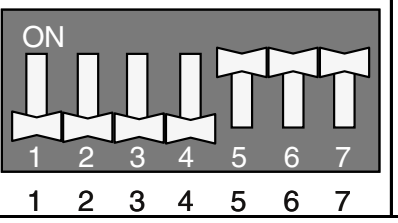
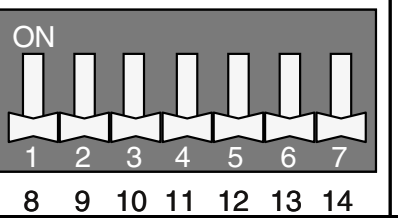
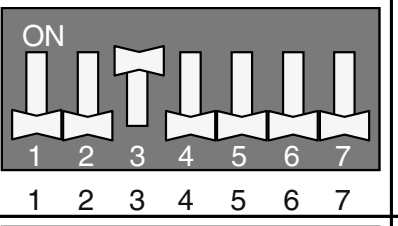
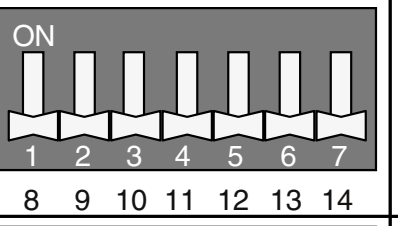
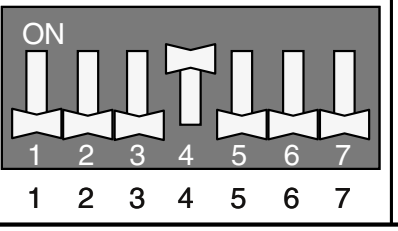
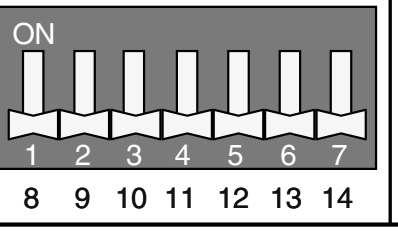
2. Settings of slave outdoor unit

Function	SW01B setting	SW02B setting	Remarks
Slave 1			
Slave 2			
Slave 3			

3. Settings of corresponding outdoor unit

Function	SW01B setting	SW02B setting	Remarks
Inverter back up			
Unit back up			

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Replacement Procedure for Compressor(ARUB80LT2 to ARUB480LT2)

1. Replacement Procedure for Compressor.....77

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Replacement Procedure for Compressor(ARUB80LT2 to ARUB480LT2)

1) Collect the refrigerant by using refrigerant recovery unit
(Since the setting on outdoor unit PCB is required for refrigerant recovery, refer to the warming plate "Precautions in service work" attached on the switch box cover)

2) Remove the sound insulator mat covering the faulty compressor, and disconnect the power

3) Disconnect the brazing sections of suction pipe and discharge pipe by using brazing torch after the refrigerant has been collected completely.

4) Remove equalizing pipe nut.

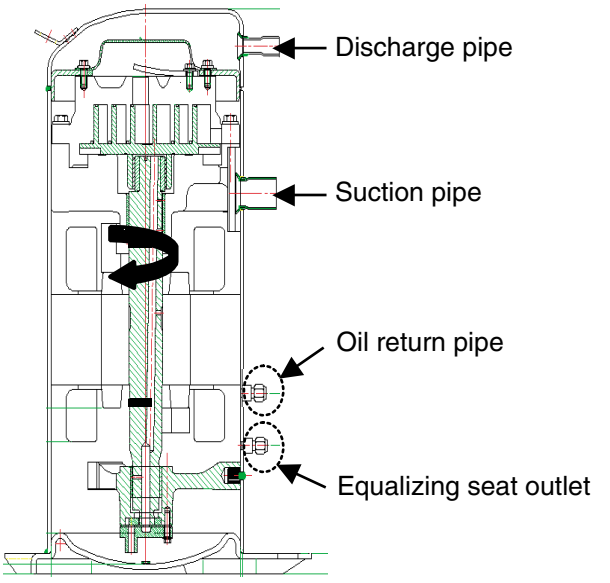
5) Remove three bolts at cushion rubber section to take out the faulty compressor outside the unit.

6) Install the new compressor in the unit.(Be sure to insert the cushion rubbers before tightening the fixing bolts of compressor.)

7) Remove the rubber caps put on the suction and discharge pipe of the new compressor to release.the sealing nitrogen gas.(Take note that oil may spout due to the pipe inside pressure if the plug put on the equalizing seat is removed before removing of rubber cap.)

8) Fasten equalizing pipe with nut.(14 ~ 18N.m)

9) Braze the suction and discharge pipe with brazing torch to the compressor.



Cut section

10) Conduct air tight test to check the piping system is free from leakage.

11) Connect power cable to the terminal board of compressor and cover the compressor with sound insulator mat.

12) Conduct vacuum drying.(Since the setting on outdoor unit PCB is required for vacuum drying, refer to the warning plate recautions in service work" attached on the switch box cover.)

13) Charge refrigerant after the completion of vacuum drying, and check the function of compressor with cooling or heating operation.

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Part 4
Trouble Shooting Guide

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Trouble Shooting Guide

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1. The Phenomena from Main Component Failure

The phenomena from main component failure

Component	Phenomenon	Cause	Check method and trouble shooting
Compressor	Not operating	Motor insulation broken	Check resistance between terminals and chassis
		Strainer clogged	Change strainer
		Oil leakage	Check oil amount after opening oil port
	Stop during running	Motor insulation failure	Check resistance between terminals and chassis
	Abnormal noise during running	R-S-T misconnection	Check compressor R-S-T connection
Outdoor fan	High pressure error in cooling mode operation	Motor failure, bad ventilation around outdoor heat exchanger	Check the fan operation to confirm proper motor functioning. Switch OFF the outdoor unit and remove obstacles, if any, around the HEX. Check connector
Outdoor EEV	Heating failure, frequent defrosting	Bad connector contact	Check resistance between terminals
	No operation sound after switching ON the power supply	Coil failure	Service necessary
	Heating failure, frozen outdoor heat exchanger part	EEV clogged	Service necessary
	Low pressure error or discharge temperature error	EEV clogged	

When system fault occurs, the error code is displayed on the indoor unit display or remote control display. The trouble shooting guide is available in the service manual.

• When CH05/53/11 error occurs, check if auto-addressing has done and communication wiring is ok.

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2. Checking Method for Key Fompornents

2.1 Compressor

Check and ensure in following order when error related with the compressor or error related with power occurs during operation:

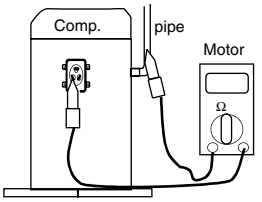
<table>
<tr><th>No.</th><th>Checking Item</th><th>Symptom</th><th>Countermeasure</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Is how long power on during operation?</td><td>1) Power on for 12 hours or more</td><td>* Go to No.2.</td></tr>
<tr><td>2) Power on for 12 hours or less</td><td>* Go to No.2 after applying power for designated time (12 hours).</td></tr>
<tr><td rowspan="3">2</td><td>Does failure appears again when starting operation?</td><td>1) The compressor stops andsame error appears again.</td><td>* Check IMP may fail.</td></tr>
<tr><td>Method to measure insulation resistance
 

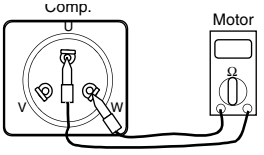
Figure 1.
Method to measure coil resistance
 

Figure 2.</td><td>2) If output voltage of the inverter is stably output. Note)</td><td>* Check coil resistor and insulation resistor. If normal, restart the unit. If same symptom occurs, replace the compressor.
* Insulation resistor: 2MW or more
Coil resistor:
<table><tr><th></th><th>Inverter</th><th>Constant</th></tr><tr><td>U-V</td><td>0.35±7%Ω</td><td>1.96±7%Ω</td></tr><tr><td>V-W</td><td>0.35±7%Ω</td><td>1.91±7%Ω</td></tr><tr><td>W-U</td><td>0.35±7%Ω</td><td>1.99±7%Ω</td></tr></table></td></tr>
<tr><td>3) If output voltage of the inverter is unstable or it is 0V.
(When incapable of using a digital tester)</td><td>* Check the IPM.
If the IPM is normal, replace the inverter board.
* Check coil resistor and insulation resistor.</td></tr>
</table>

Note)

[Cautions when measuring voltage and current of inverter power circuit]

Measuring values may differ depending on measuring tools and measuring circuits since voltage, current in the power supply or output side of the inverter has no since waveform.
Especially, output voltage changes when output voltage of the inverter has a pattern of pulse wave.
In addition, measuring values appear largely differently depending on measuring tools.

1) If using a movable tester when checking that output voltage of the inverter is constant (when comparing relative voltage between lines), always use an analog tester. Especially exercise particular caution if the output frequency of the inverter is low, when using a movable tester, where change of measured voltage values is large between other lines, when virtually same values appear actually or where there is danger to determine that failure of the inverter occurred.
2) You can use rectification voltmeter (→if using commercial frequency tester when measuring output values of the inverter (when measuring absolute values). Accurate measuring values cannot be obtained with a general movable tester (For analog and digital mode).

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2.2 Fan Motor

Checking item	Symptom	Countermeasure
(1) The fan motor does not operate. Does failure appears again when starting operation? (2) Vibration of the fan motor is large.	1) When power supply is abnormal	* Modify connection status in front of or at the rear of the breaker, or if the power terminal console is at frosting condition.
		* Modify the power supply voltage is beyond specified scope.
	2) For wrong wiring	* For following wiring. 1. Check connection status. 2. Check contact of the connector. 3. Check that parts are firmly secured by tightening screws. 4. Check connection of polarity. 5. Check short circuit and grounding.
	3) For failure of motor	* Measure winding resistance of the motor coils.
	4) For defective fuse 5) For failure of circuit board	* Replace the fuse if there is defect (Fuse 800V 30A). Replace the circuit board in following procedures if problems occur again when powering on and if there are no matters equivalent to items as specified in above 1) through 4). (Carefully check both connector and grounding wires when replacing the circuit board.) 1. Replace only fan control boards. If starting is done, it means that the fan control board has defect. 2. Replace both fan control board and the main board. If starting is done, it means that the main board has defect. 3. If problems continue to occur even after countermeasure of No.1 and No.2, it means that both boards has defect.

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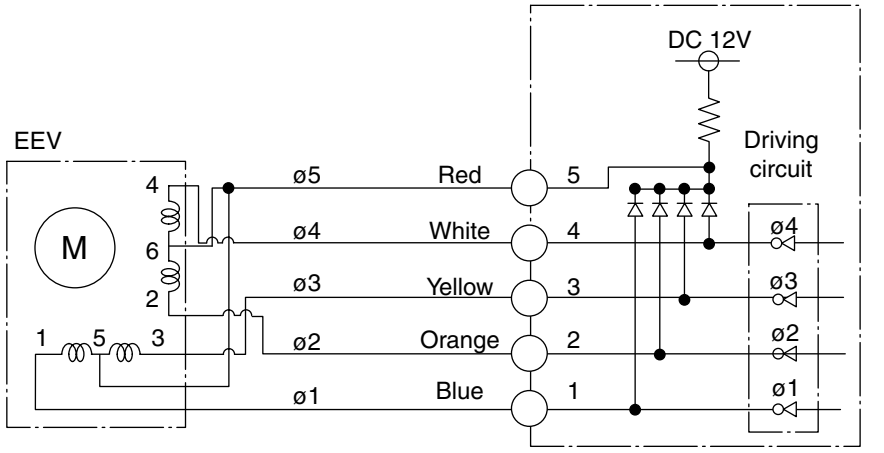
2.3 Electronic Expansion Valve



• Pulse signal output value and valve operation

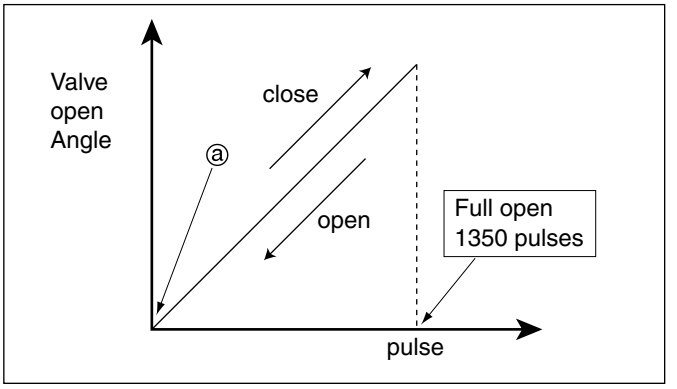
Output(ø) No.	Output state										
	1	2	3	4	5	6	7	8	9	10	11
ø1	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	OFF
ø2	ON	ON	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF
ø3	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
ø4	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF

• Output pulse sequence

- In valve close state: 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 9 → 10 → 11 → 1
- In valve open state: 11 → 10 → 9→ 8 → 7 → 6 → 5 → 4 → 3 → 2 → 1 → 11

* 1. If EEV open angle does not change, all of output phase will be OFF
2. If output phase is different or continuously in the ON state, motor will not operate smoothly and start vibrating.

• EEV valve operation



- At power ON, open angle signal of 1400 pulses output and valve position is set to ⓐ
  If valve operates smoothly, no noise and vibration occurs and if valve is closed. noise occurs.
- Noise from EEV can be confirmed by touching the EEV surface with a screw driver and listening the EEV noise.
- If liquid refrigerant is in EEV, the noise is lower.

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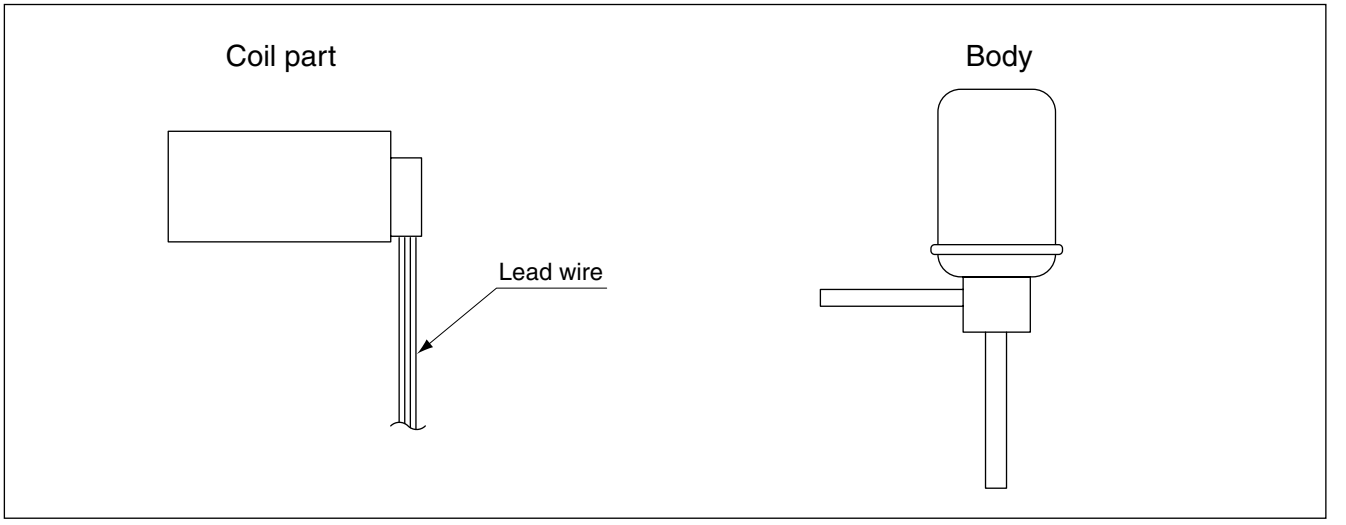
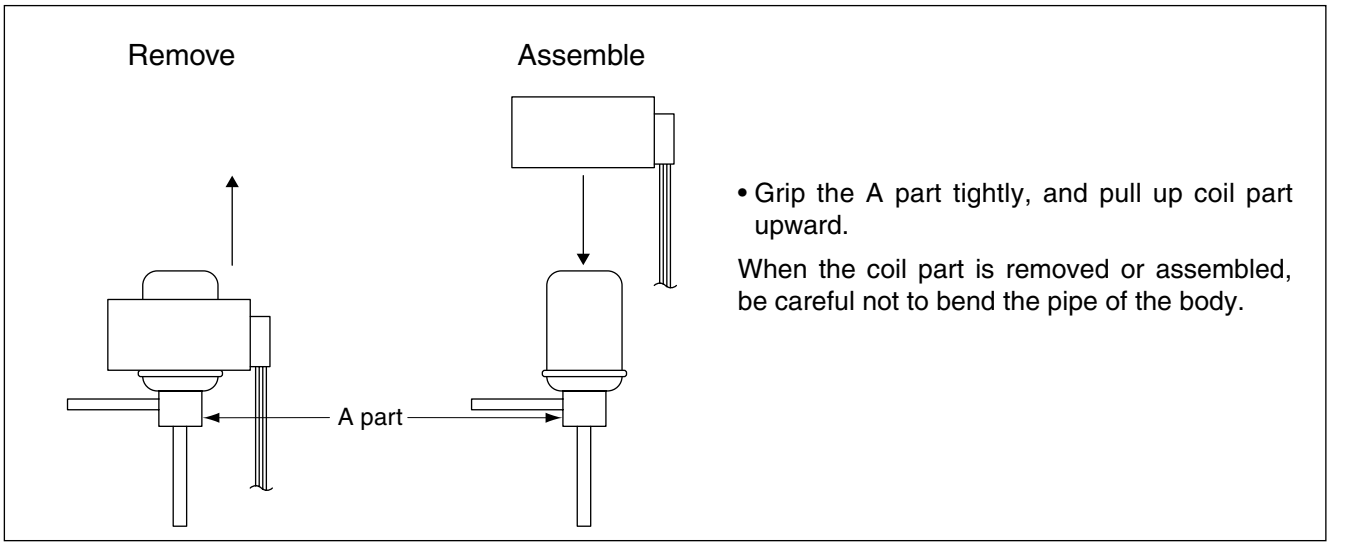
• EEV coil and body(Outdoor unit)



• Remove and assemble the coil



• Grip the A part tightly, and pull up coil part upward.

When the coil part is removed or assembled, be careful not to bend the pipe of the body.

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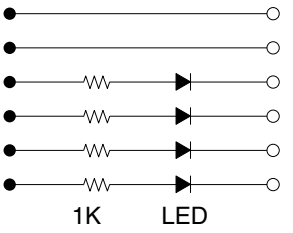
- **EEV failure check method**

Failure mode	Diagnosis	Repair process	Unit
Microcomputer driving circuit failure	1.Disconnect the EEV connector form control board and connect testing LED  2. Main power ON, pulse signal is out from EEV for 17 sec. If LEDs do not turn on, or are in on state continuously, then driving circuit is abnormal	Check and replace Indoor unit control board	Indoor unit
EEV locking	1.If EEV is locked, in no load state, the driving motor rotate, and clicking sound always occurs	Replace EEV	Indoor / Outdoor unit
EEV motor coil short or misconnection	1. Check the resistance between coil terminal (red-white, red-yellow, red-orange, red-blue) 2. If the estimated resistance value is in 52 ± 3Ω then the EEV is normal	Replace EEV	Outdoor unit
	1. Check the resistance between coil terminal (brown-white, brown-yellow, brown-orange, brown-blue) 2. If the estimated resistance value is in 150 ± 10Ω then the EEV is normal	Replace EEV	Indoor unit
Full closing (valve leakage)	1. Operate indoor unit with fan mode and operate another indoor unit with cooling mode 2. Check indoor unit(Fan mode) liquid pipe temperature (from operation monitor of outdoor unit control board) 3. When fan rotate and EEV is fully closed, if there is any leakage, then the temperature is down If estimated temperature is very low in comparison with suction temperature which is displayed at remote controller then the valve is not fully closed	If the amount of leakage is much, Replace EEV	Indoor unit

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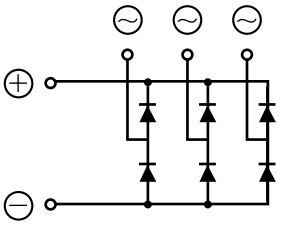
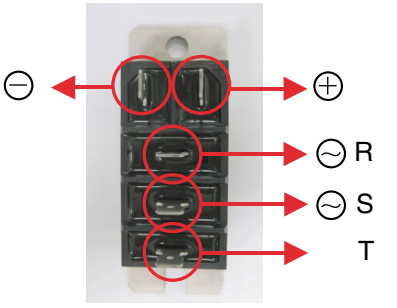
2.4 Phase Bridge Diode Checking Method

Internal circuit diagram



Appearance



1. Wait until inverter PCB DC voltage gets discharged, after the main power switch off.
2. Pull out all the connectors connected with 3 phase bridge diode.
3. Set multi tester in diode mode.
4. Measured value should be 0.4~0.7V measuring as below table.
5. In case the measured value is different from the table, set multi tester to resistance mode and measure. If the value is small (0 Ω) or high (hundreds M Ω), PCB needs to be replaced.
6. In case that bridge diode is damaged, check if inverter PCB assembly(IPM) is needed to be replaced.

Diode terminal / Tester terminal	+ terminal: black(-)	- terminal: red(+)
R(~) : red(+)	0.4 V ~ 0.7 V	-
S(~) : red(+)	0.4 V ~ 0.7 V	-
T(~) : red(+)	0.4 V ~ 0.7 V	-
R(~) : black(-)	-	0.4 V ~ 0.7 V
S(~) : black(-)	-	0.4 V ~ 0.7 V
T(~) : black(-)	-	0.4 V ~ 0.7 V

✻ Red(+) and black(-) are the measuring terminals of multi tester.

Caution

- **Check the electric parts of c/box, 10 minutes after switching off the main supply and checking DC voltage is discharged. Otherwise, there is chance of getting electric shock.**
- **There is chance of electric shock by charged voltage.**

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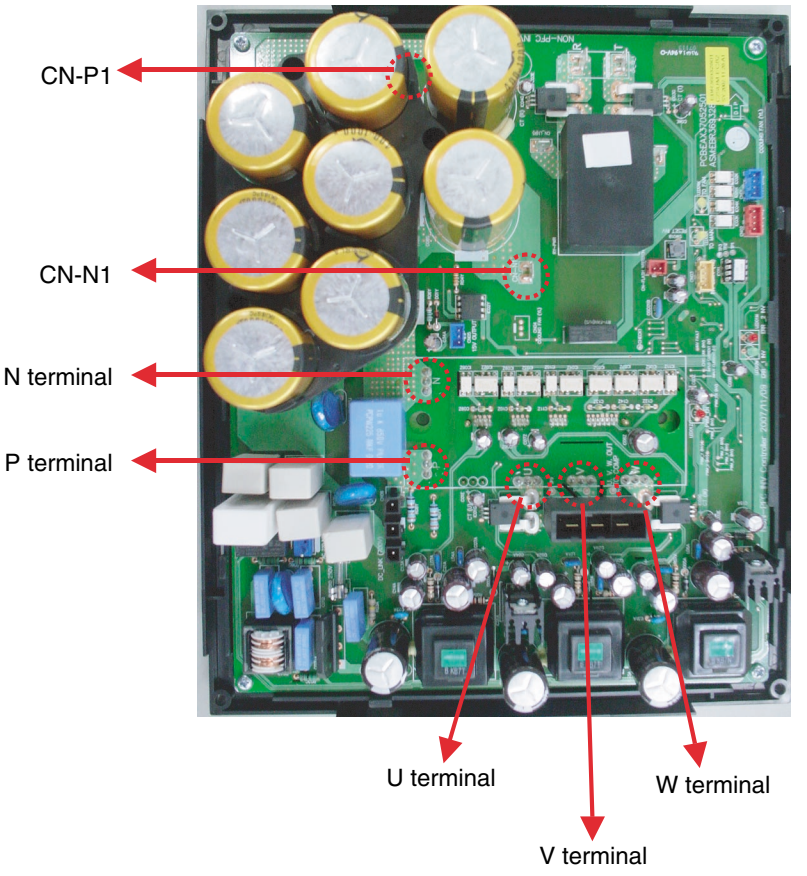
2.5 Inverter IPM Checking Method



1. Wait until inverter PCB DC voltage is discharged after main power off.
2. Pull out CN-P1, CN-N1 connectors and U,V,W compressor connector connected with the inverter PCB.
3. Set multi tester to resistance mode.
4. If the value between P and N terminal of IPM is short(0Ω) or open(hundreds MΩ), PCB needs to be replaced.(IPM damaged)
5. In the measured value with resistance mode should be within 28K Ω ±10%.
6. In case measured value is different from the table, PCB needs to be replaced.(PCB damaged).

	P terminal : black (-)	**N terminal : red (-)**
U terminal : red(+)	28K Ω ± 10%	Open
V terminal : red(+)	28K Ω ± 10%	Open
W terminal : red(+)	28K Ω ± 10%	Open
	P terminal : red(+)	**N terminal : red (+)**
U terminal : black(-)	Open	28K Ω ± 10%
V terminal : black(-)	Open	28K Ω ± 10%
W terminal : black(-)	Open	28K Ω ± 10%

✻ Red(+) and black(-) are the measuring terminals of multi tester.

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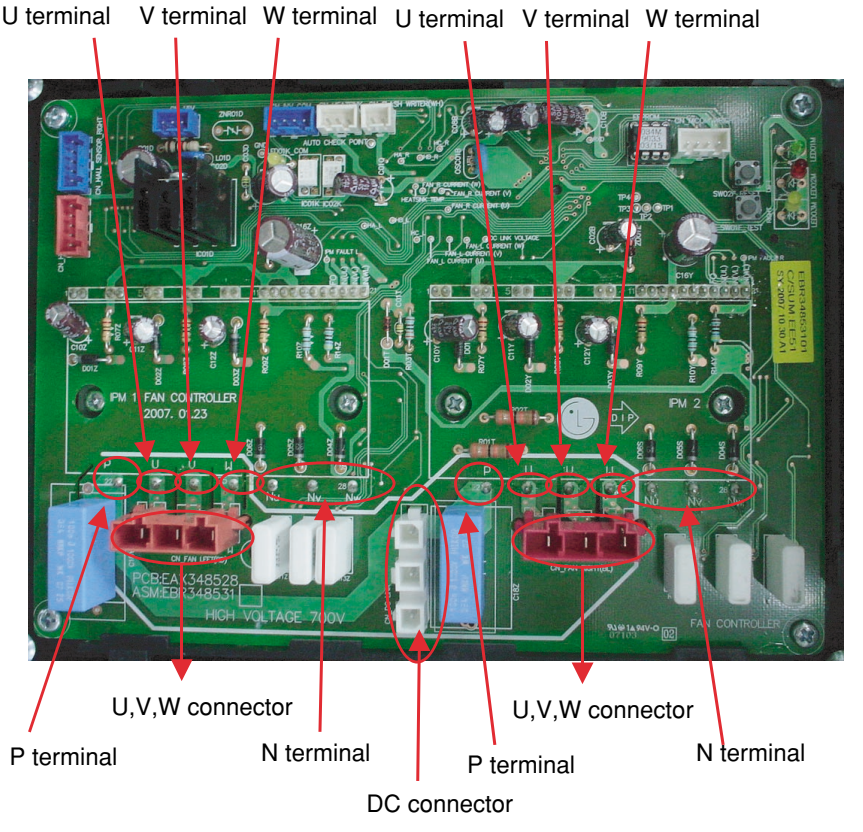
2.6 Fan IPM Checking Method

1. Wait until inverter PCB DC voltage gets discharged after the main power switch off.
2. Pull out DC connector and U,V,W fan motor connector connected with fan PCB
3. Set multi tester in resistance mode .
4. If the value between P and N terminal of IPM is small (0Ω) or tens KΩ, PCB needs to be replaced (IPM damaged).
5. In case the measured value is open(hundreds KΩ), measure resistance mode, and the value should be within 35 KΩ ±10% as shown below table.
6. If the measured value is different from the value given in the table, PCB is needs to be replaced.

	P terminal : black (-)	**N terminal : red (-)**
U terminal : red(+)	35K Ω ± 10%	Open
V terminal : red(+)	35K Ω ± 10%	Open
W terminal : red(+)	35K Ω ± 10%	Open
	P terminal : red(+)	**N terminal : red (+)**
U terminal : black(-)	Open	35K Ω ± 10%
V terminal : black(-)	Open	35K Ω ± 10%
W terminal : black(-)	Open	35K Ω ± 10%

✻ Red(+) and black(-) are the measuring terminals of multi tester.

2.7 UW1 Chassis(2 Fan)



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2.8 Other

Electrolytic capacitor and resistor for voltage distribution

1) Disconnect an terminal of voltage distribution resistor from each DC link electrolytic capacitor
2) Set the multi meter to resistance mode, connect the probe to +,- terminal of the capacitor. If the estimated resistance value is increase continuously without short(value is 0), then the resistor is normal
3) Set the multi meter to resistance mode, confirm that the resistance value of the resistor is around 270 kΩ

Check and replace inferior components

Caution **In case that the control box is opened and before checking electrical parts, it should be checked that the LED 01Y turned off (wait 3 minutes after main power OFF), otherwise it may cause electrical shock.**

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3. Self-Diagnosis Function

Self-Diagnosis Function

Error indicator

- This function indicates types of failure in self-diagnosis and occurrence of failure for air condition.
- Error mark is displayed on display window of indoor units and wired remote controller, and 7-segment LED of outdoor unit control board as shown in the table.
- If more than two troubles occur simultaneously, lower number of error code is first displayed.
- After error occurrence, if error is released, error LED is also released simultaneously.

Error display

1st,2nd LED of 7-segment indicates error number, 3rd LED indicates unit number.

Ex) 211 : No.21 error of master unit
213 : No.21 error of slave2
011 → 051 : No.105 error of master unit

	Display			Title	Cause of error
Indoor unit related error	0	1	-	Air temperature sensor of indoor unit	Air temperature sensor of indoor unit is open or short
	0	2	-	Inlet pipe temperature sensor of indoor unit	Inlet pipe temperature sensor of indoor unit is open or short
	0	3	-	Transmission error : wired remote controller ↔ indoor unit	Failing to receive wired remote controller signal in indoor unit PCB
	0	4	-	Drain pump	Malfunction of drain pump
	0	5	-	Transmission error : outdoor unit ↔ indoor unit	Failing to receive outdoor unit signal in indoor unit PCB
	0	6	-	Outlet pipe temperature sensor of indoor unit	Outlet pipe temperature sensor of indoor unit is open or short
	0	7	-	Different operation mode	Operation mode between indoor unit and outdoor unit is different
	0	9	-	Serial No.	In case when the serial number marked on EEPROM of Indoor unit is 0 or FFFFFF
	1	0	-	Poor fan motor operation	Disconnecting the fan motor connector/Failure of indoor fan motor lock
	1	1	-	Transmission error: indoor unit → main PCB of outdoor.	When the addressing signal doesn't respond for 3mins. suddenly, while the indoor unit gets the calling signal from the outdoor unit,
Outdoor unit related error	2	1	1	Master outdoor unit inverter compressor IPM Fault	Master outdoor unit inverter compressor drive IPM fault
			2	Slave1 outdoor unit inverter compressor IPM fault	Slave1 outdoor unit inverter compressor drive IPM fault
			3	Slave2 outdoor unit inverter compressor IPM fault	Slave2 outdoor unit inverter compressor drive IPM fault
			4	Slave3 outdoor unit inverter compressor IPM fault	Slave3 outdoor unit inverter compressor drive IPM fault
	2	2	1	Inverter board input over current(RMS) of master outdoor unit	Master outdoor unit inverter board input current excess (RMS)
			2	Inverter board input over current(RMS) of slave1 outdoor unit	Slave1 outdoor unit inverter board input current excess (RMS)
			3	Inverter board input over current(RMS) of slave2 outdoor unit	Slave2 outdoor unit inverter board input current excess (RMS)
			4	Inverter board input over current(RMS) of slave3 outdoor unit	Slave3 outdoor unit inverter board input current excess (RMS)

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	Display			Title	Cause of error
Outdoor unit related error	2	3	1	Master outdoor unit inverter compressor DC link low voltage	DC charging is not performed at master outdoor unit after starting relay turn on.
			2	Slave1 outdoor unit inverter compressor DC link low voltage	DC charging is not performed at slave1 outdoor unit after starting relay turn on.
			3	Slave2 outdoor unit inverter compressor DC link low voltage	DC charging is not performed at slave2 outdoor unit after starting relay turn on.
			4	Slave3 outdoor unit inverter compressor DC link low voltage	DC charging is not performed at slave3 outdoor unit after starting relay turn on.
	2	4	1	Master outdoor unit high pressure switch	System is turned off by master outdoor unit high pressure switch.
			2	Slave1 outdoor unit high pressure switch	System is turned off by slave1 outdoor unit high pressure switch.
			3	Slave2 outdoor unit high pressure switch	System is turned off by slave2 outdoor unit high pressure switch.
			4	Slave3 outdoor unit high pressure switch	System is turned off by slave3 outdoor unit high pressure switch.
	2	5	1	Master outdoor unit input voltage high/ low voltage	Master outdoor unit input voltage is over 487V or below 270V
			2	Slave1 outdoor unit input voltage high/ low voltage	Slave1 outdoor unit input voltage is over 487V or below 270V
			3	Slave2 outdoor unit input voltage high/ low voltage	Slave2 outdoor unit input voltage is over 487V or below 270V
			4	Slave3 outdoor unit input voltage high/ low voltage	Slave3 outdoor unit input voltage is over 487V or below 270V
	2	6	1	Master outdoor unit inverter compressor start failure	The first start failure by master outdoor unit inverter compressor abnormality
			2	Slave1 outdoor unit inverter compressor start failure	The first start failure by slave1 outdoor unit inverter compressor abnormality
			3	Slave2 outdoor unit inverter compressor start failure	The first start failure by slave2 outdoor unit inverter compressor abnormality
			4	Slave3 outdoor unit inverter compressor start failure	The first start failure by slave3 outdoor unit inverter compressor abnormality
	2	8	1	Master outdoor unit inverter DC link high voltage	System is turned off by master outdoor unit DC voltage over charging
			2	Slave1 outdoor unit inverter DC link high voltage	System is turned off by slave1 outdoor unit DC voltage over charging
			3	Slave2 outdoor unit inverter DC link high voltage	System is turned off by slave2 outdoor unit DC voltage over charging
			4	Slave3 outdoor unit inverter DC link high voltage	System is turned off by slave3 outdoor unit DC voltage over charging
	2	9	1	Master outdoor unit inverter compressor over current	Master outdoor unit inverter compressor fault OR drive fault
			2	Slave1 outdoor unit inverter compressor over current	Slave1 outdoor unit inverter compressor fault OR drive fault
			3	Slave2 outdoor unit inverter compressor over current	Slave2 outdoor unit inverter compressor fault OR drive fault
			4	Slave3 outdoor unit inverter compressor over current	Slave3 outdoor unit inverter compressor fault OR drive fault

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	Display			Title	Cause of error
Outdoor unit related error	**3**	**2**	**1**	Master outdoor unit inverter compressor high discharge temperature	System is turned off by master outdoor unit inverter compressor high discharge temperature
			2	Slave1 outdoor unit inverter compressor high discharge temperature	System is turned off by slave1 outdoor unit inverter compressor high discharge temperature
			3	Slave2 outdoor unit inverter compressor discharge high temperature	System is turned off by slave2 outdoor unit inverter compressor high discharge temperature
			4	Slave3 outdoor unit inverter compressor high discharge temperature	System is turned off by slave3 outdoor unit inverter compressor high discharge temperature
	3	**3**	**1**	Master outdoor unit constant speed compressor high discharge temperature	System is turned off by master outdoor unit constant speed high discharge temperature
			2	Slave1 outdoor unit constant speed compressor high discharge temperature	System is turned off by slave1 outdoor unit constant speed high discharge temperature
			3	Slave2 outdoor unit constant speed compressor high discharge temperature	System is turned off by slave2 outdoor unit constant speed high discharge temperature
			4	Slave3 outdoor unit constant speed compressor high discharge temperature	System is turned off by slave3 outdoor unit constant speed high discharge temperature
	3	**4**	**1**	High pressure of master outdoor unit	System is turned off by excessive increase of high pressure of master outdoor unit
			2	High pressure of slave1 outdoor unit	System is turned off by excessive increase of high pressure of slave1 outdoor unit
			3	High pressure of slave2 outdoor unit	System is turned off by excessive increase of high pressure of slave2 outdoor unit
			4	High pressure of slave3 outdoor unit	System is turned off by excessive increase of high pressure of slave3 outdoor unit
	3	**5**	**1**	Low pressure of master outdoor unit	System is turned off by excessive decrease of low pressure of master outdoor unit
			2	Low pressure of slave1 outdoor unit	System is turned off by excessive decrease of low pressure of slave1 outdoor unit
			3	Low pressure of slave2 outdoor unit	System is turned off by excessive decrease of low pressure of slave2 outdoor unit
			4	Low pressure of slave3 outdoor unit	System is turned off by excessive decrease of low pressure of slave3 outdoor unit

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	Display			Title	Cause of error
Outdoor unit related error	4	0	1	Master outdoor unit inverter compressor CT sensor fault	Master outdoor unit inverter compressor CT sensor open or short
			2	Slave1 outdoor unit inverter compressor CT sensor fault	Slave1 outdoor unit inverter compressor CT sensor open or short
			3	Slave2 outdoor unit inverter compressor CT sensor fault	Slave2 outdoor unit inverter compressor CT sensor open or short
			4	Slave3 outdoor unit inverter compressor CT sensor fault	Slave3 outdoor unit inverter compressor CT sensor open or short
	4	1	1	Master outdoor unit inverter compressor discharge temperature sensor fault	Master outdoor unit inverter compressor discharge temperature sensor open or short
			2	Slave1 outdoor unit inverter compressor discharge temperature sensor fault	Slave1 outdoor unit inverter compressor discharge temperature sensor open or short
			3	Slave2 outdoor unit inverter compressor discharge temperature sensor fault	Slave2 outdoor unit inverter compressor discharge temperature sensor open or short
			4	Slave3 outdoor unit inverter compressor discharge temperature sensor fault	Slave3 outdoor unit inverter compressor discharge temperature sensor open or short
	4	2	1	Master outdoor unit low pressure sensor fault	Master outdoor unit low pressure sensor open or short
			2	Slave1 outdoor unit low pressure sensor fault	Slave1 outdoor unit low pressure sensor open or short
			3	Slave2 outdoor unit low pressure sensor fault	Slave2 outdoor unit low pressure sensor open or short
			4	Slave3 outdoor unit low pressure sensor fault	Slave3 outdoor unit low pressure sensor open or short
	4	3	1	Master outdoor unit high pressure sensor fault	Master outdoor unit high pressure sensor open or short
			2	Slave1 outdoor unit high pressure sensor fault	Slave1 outdoor unit high pressure sensor open or short
			3	Slave2 outdoor unit high pressure sensor fault	Slave2 outdoor unit high pressure sensor open or short
			4	Slave3 outdoor unit high pressure sensor fault	Slave3 outdoor unit high pressure sensor open or short
	4	4	1	Master outdoor unit air temperature sensor fault	Master outdoor unit air temperature sensor open or short
			2	Slave1 outdoor unit air temperature sensor fault	Slave1 outdoor unit air temperature sensor open or short
			3	Slave2 outdoor unit air temperature sensor fault	Slave2 outdoor unit air temperature sensor open or short
			4	Slave3 outdoor unit air temperature sensor fault	Slave3 outdoor unit air temperature sensor open or short

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	Display			Title	Cause of error
Outdoor unit related error	4	5	1	Master outdoor unit heat exchanger temperature sensor(A) fault	Master outdoor unit heat exchanger temperature sensor(A) open or short
			2	Slave1 outdoor unit heat exchanger temperature sensor(A) fault	Slave1 outdoor unit heat exchanger temperature sensor(A) open or short
			3	Slave2 outdoor unit heat exchanger temperature sensor(A) fault	Slave2 outdoor unit heat exchanger temperature sensor(A) open or short
			4	Slave3 outdoor unit heat exchanger temperature sensor(A) fault	Slave3 outdoor unit heat exchanger temperature sensor(A) open or short
	4	6	1	Master outdoor unit suction temperature sensor fault	Master outdoor unit suction temperature sensor open or short
			2	Slave1 outdoor unit suction temperature sensor fault	Slave1 outdoor unit suction temperature sensor open or short
			3	Slave2 outdoor unit suction temperature sensor fault	Slave2 outdoor unit suction temperature sensor open or short
			4	Slave3 outdoor unit suction temperature sensor fault	Slave3 outdoor unit suction temperature sensor open or short
	4	7	1	Master outdoor unit constant speed compressor discharge temperature sensor fault	Master outdoor unit constant speed compressor discharge temperature sensor open or short
			2	Slave1 outdoor unit constant speed compressor discharge temperature sensor fault	Slave1 outdoor unit constant speed compressor discharge temperature sensor open or short
			3	Slave2 outdoor unit constant speed compressor discharge temperature sensor fault	Slave2 outdoor unit constant speed compressor discharge temperature sensor open or short
			4	Slave3 outdoor unit constant speed compressor discharge temperature sensor fault	Slave3 outdoor unit constant speed compressor discharge temperature sensor open or short
	4	8	1	Master outdoor unit heat exchanger temperature sensor(B) fault	Master outdoor unit heat exchanger temperature sensor(B) open or short
			2	Slave1 outdoor unit heat exchanger temperature sensor(B) fault	Slave1 outdoor unit heat exchanger temperature sensor(B) open or short
			3	Slave2 outdoor unit heat exchanger temperature sensor(B) fault	Slave2 outdoor unit heat exchanger temperature sensor(B) open or short
			4	Slave3 outdoor unit heat exchanger temperature sensor(B) fault	Slave3 outdoor unit heat exchanger temperature sensor(B) open or short

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	Display			Title	Cause of error
Outdoor unit related error	5	0	1	Omitting connection of R power of outdoor unit = 50 error ❉ Note Omitting connection of S power of outdoor unit = 23 error Omitting connection of T power of outdoor unt = Main PCB power off	Omitting connection of master outdoor unit
			2		Omitting connection of slave1 outdoor unit
			3		Omitting connection of slave2 outdoor unit
			4		Omitting connection of slave3 outdoor unit
	5	1	1	Excessive capacity of indoor units	Excessive connection of indoor units compared to capacity of outdoor unit
	5	2	1	Transmission error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of master outdoor unit
			2	Transmission error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of slave1 outdoor unit
			3	Transmission error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of slave2 outdoor unit
			4	Transmission error : inverter PCB → Main PCB	Failing to receive inverter signal at main PCB of slave3 outdoor unit
	5	3	1	Transmission error : indoor unit → main PCB of outdoor unit	Failing to receive indoor unit signal at main PCB of outdoor unit.
	5	4	1	Reverse connection of R, S, T power of master outdoor unit	Reverse connection or omitting connection of R, S, T power of master outdoor unit
			2	Reverse connection of R, S, T power of slave1 outdoor unit	Reverse connection or omitting connection of R, S, T power of slave1 outdoor unit
			3	Reverse connection of R, S, T power of slave2 outdoor unit	Reverse connection or omitting connection of R, S, T power of slave2 outdoor unit
			4	Reverse connection of R, S, T power of slave3 outdoor unit	Reverse connection or omitting connection of R, S, T power of slave3 outdoor unit
	5	9	1	Mixing installation of sub outdoor unit	Mixing installation of old sub outdoor unit and New slave outdoor unit
	6	0	1	Inverter PCB EEPROM error of master outdoor unit	Access error of inverter PCB of master outdoor unit
			2	Inverter PCB EEPROM error of slave1 unit	Access error of inverter PCB of slave1 outdoor unit
			3	Inverter PCB EEPROM error of slave2 unit	Access error of inverter PCB of slave2 outdoor unit
			4	Inverter PCB EEPROM error of slave3 unit	Access error of inverter PCB of slave3 outdoor unit
	6	7	1	Master outdoor unit fan lock	Restriction of master outdoor unit
			2	Slave1 outdoor unit fan lock	Restriction of slave1 outdoor unit
			3	Slave2 outdoor unit fan lock	Restriction of slave2 outdoor unit
			4	Slave3 outdoor unit fan lock	Restriction of slave3 outdoor unit

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	Display			Title	Cause of error
Outdoor unit related error	7	0	1	Constant CT sensor error of master outdoor unit	Constant CT sensor open or short of master outdoor unit
			2	Constant CT sensor error of slave1 outdoor unit	Constant CT sensor open or short of slave1 outdoor unit
			3	Constant CT sensor error of slave2 outdoor unit	Constant CT sensor open or short of slave2 outdoor unit
			4	Constant CT sensor error of slave3 outdoor unit	Constant CT sensor open or short of slave3 outdoor unit
	7	1	1	PFC CT sensor error of master outdoor unit	Master outdoor unit PFC CT sensor open or short
			2	PFC CT sensor error of slave1 outdoor unit	Slave1 outdoor unit PFC CT sensor open or short
			3	PFC CT sensor error of slave2 outdoor unit	Slave2 outdoor unit PFC CT sensor open or short
			4	PFC CT sensor error of slave3 outdoor unit	Slave3 outdoor unit PFC CT sensor open or short
	7	3	1	Instant over current(Peak) of master outdoor unit PFC	Instant over current(Peak) of master outdoor unit PFC
			2	Instant over current(Peak) of slave1 outdoor unit PFC	Instant over current(Peak) of slave1 outdoor unit PFC
			3	Instant over current(Peak) of slave2 outdoor unit PFC	Instant over current(Peak) of slave2 outdoor unit PFC
			4	Instant over current(Peak) of slave3 outdoor unit PFC	Instant over current(Peak) of slave3 outdoor unit PFC
	7	4	1	Master outdoor unit 3 phase power unbalance	Master outdoor unit R-T phase difference is over 5A
			2	Slave1 outdoor unit 3 phase power unbalance	Slave1 outdoor unit R-T phase difference is over 5A
			3	Slave2 outdoor unit 3 phase power unbalance	Slave2 outdoor unit R-T phase difference is over 5A
			4	Slave3 outdoor unit 3 phase power unbalance	Slave3 outdoor unit R-T phase difference is over 5A
	7	5	1	Master outdoor unit fan CT sensor error	Master outdoor unit fan CT sensor open or short
			2	Slave1 outdoor unit fan CT sensor error	Slave1 outdoor unit fan CT sensor open or short
			3	Slave2 outdoor unit fan CT sensor error	Slave2 outdoor unit fan CT sensor open or short
			4	Slave3 outdoor unit fan CT sensor error	Slave3 outdoor unit fan CT sensor open or short
	7	6	1	Master outdoor unit fan DC link high voltage error	Master outdoor unit fan DC link high voltage error
			2	Slave1 outdoor unit fan DC link high voltage error	Slave1 outdoor unit fan DC link high voltage error
			3	Slave2 outdoor unit fan DC link high voltage error	Slave2 outdoor unit fan DC link high voltage error
			4	Slave3 outdoor unit fan DC link high voltage error	Slave3 outdoor unit fan DC link high voltage error

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	Display			Title	Cause of error
Outdoor unit related error	7	7	1	Master outdoor unit fan over current error	Master outdoor unit fan current is over 5A
			2	Slave1 outdoor unit fan over current error	Slave1 outdoor unit fan is over 5A
			3	Slave2 outdoor unit fan over current error	Slave2 outdoor unit fan is over 5A
			4	Slave3 outdoor unit fan over current error	Slave3 outdoor unit fan is over 5A
	7	8	1	Master outdoor unit fan hall sensor error	Master outdoor unit fan hall sensor open or short
			2	Slave1 outdoor unit fan hall sensor error	Slave1 outdoor unit fan hall sensor open or short
			3	Slave2 outdoor unit fan hall sensor error	Slave2 outdoor unit fan hall sensor open or short
			4	Slave3 outdoor unit fan hall sensor error	Slave3 outdoor unit fan hall sensor open or short
	7	9	1	Master outdoor unit fan start failure error	Master outdoor unit fan first position sensing failure
			2	Slave1 outdoor unit fan start failure error	Slave1 outdoor unit fan first position sensing failure
			3	Slave2 outdoor unit fan start failure error	Slave2 outdoor unit fan first position sensing failure
			4	Slave3 outdoor unit fan start failure error	Slave3 outdoor unit fan first position sensing failure
	8	6	1	Master outdoor unit main PCB EEP-ROM error	Communication fail between master outdoor unit main MICOM and EEPROM or omitting EEPROM
			2	Slave1 outdoor unit main PCB EEP-ROM error	Communication fail between slave1 outdoor unit main MICOM and EEPROM or omitting EEPROM
			3	Slave2 outdoor unit main PCB EEP-ROM error	Communication fail between slave2 outdoor unit main MICOM and EEPROM or omitting EEPROM
			4	Slave3 outdoor unit main PCB EEP-ROM error	Communication fail between slave3 outdoor unit main MICOM and EEPROM or omitting EEPROM
	8	7	1	Master outdoor unit fan PCB EEP-ROM error	Communication fail between master outdoor unit fan MICOM and EEPROM or omitting EEPROM
			2	Slave1 outdoor unit fan PCB EEP-ROM error	Communication fail between slave1 outdoor unit fan MICOM and EEPROM or omitting EEPROM
			3	Slave2 outdoor unit fan PCB EEP-ROM error	Communication fail between slave2 outdoor unit fan MICOM and EEPROM or omitting EEPROM
			4	Slave3 outdoor unit fan PCB EEP-ROM error	Communication fail between slave3 outdoor unit fan MICOM and EEPROM or omitting EEPROM

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	Display				Title	Cause of error
Outdoor unit related error	1	0	4	1	Communication error between master outdoor unit and other outdoor unit	Failing to receive slave unit signal at main PCB of master outdoor unit
				2	Communication error between slave1 outdoor unit and other outdoor unit	Failing to receive master and other slave unit signal at main PCB of slave1 outdoor unit
				3	Communication error between slave2 outdoor unit and other outdoor unit	Failing to receive master and other slave unit signal at main PCB of slave2 outdoor unit
				4	Communication error between slave3 outdoor unit and other outdoor unit	Failing to receive master and other slave unit signal at main PCB of slave3 outdoor unit
	1	0	5	1	Master outdoor unit fan PCB communication error	Failing to receive fan signal at main PCB of master unit.
				2	Slave1 outdoor unit fan PCB communication error	Failing to receive fan signal at main PCB of slave1 unit.
				3	Slave2 outdoor unit fan PCB communication error	Failing to receive fan signal at main PCB of slave2 unit.
				4	Slave3 outdoor unit fan PCB communication error	Failing to receive fan signal at main PCB of slave3 unit.
	1	0	6	1	Master outdoor unit fan IPM fault error	Instant over current at master outdoor unit fan IPM
				2	Slave1 outdoor unit fan IPM fault error	Instant over current at slave1 outdoor unit fan IPM
				3	Slave2 outdoor unit fan IPM fault error	Instant over current at slave2 outdoor unit fan IPM
				4	Slave3 outdoor unit fan IPM fault error	Instant over current at slave3 outdoor unit fan IPM
	1	0	7	1	Master outdoor unit fan DC link low voltage error	Master outdoor unit fan DC link input voltage is under 380V
				2	Slave1 outdoor unit fan DC link low voltage error	Slave1 outdoor unit fan DC link input voltage is under 380V
				3	Slave2 outdoor unit fan DC link low voltage error	Slave2 outdoor unit fan DC link input voltage is under 380V
				4	Slave3 outdoor unit fan DC link low voltage error	Slave3 outdoor unit fan DC link input voltage is under 380V
	1	1	3	1	Master outdoor unit liquid pipe temperature sensor error	Liquid pipe temperature sensor of master outdoor unit is open or short
				2	Slave1 outdoor unit liquid pipe temperature sensor error	Liquid pipe temperature sensor of slave1 outdoor unit is open or short
				3	Slave2 outdoor unit liquid pipe temperature sensor error	Liquid pipe temperature sensor of slave2 outdoor unit is open or short
				4	Slave3 outdoor unit liquid pipe temperature sensor error	Liquid pipe temperature sensor of slave3 outdoor unit is open or short

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	Display				Title	Cause of error
Outdoor unit related error	1	1	4	1	Master outdoor unit subcooling inlet temperature sensor error	Master outdoor unit subcooling inlet temperature sensor open or short
				2	Slave1 outdoor unit subcooling inlet temperature sensor error	Slave1 outdoor unit subcooling inlet temperature sensor open or short
				3	Slave2 outdoor unit subcooling inlet temperature sensor error	Slave2 outdoor unit subcooling inlet temperature sensor open or short
				4	Slave3 outdoor unit subcooling inlet temperature sensor error	Slave3 outdoor unit subcooling inlet temperature sensor open or short
	1	1	5	1	Master outdoor unit subcooling outlet temperature sensor error	Master outdoor unit subcooling outlet temperature sensor open or short
				2	Slave1 outdoor unit subcooling outlet temperature sensor error	Slave1 outdoor unit subcooling outlet temperature sensor open or short
				3	Slave2 outdoor unit subcooling outlet temperature sensor error	Slave2 outdoor unit subcooling outlet temperature sensor open or short
				4	Slave3 outdoor unit subcooling outlet temperature sensor error	Slave3 outdoor unit subcooling outlet temperature sensor open or short
	1	5	1	1	Failure of operation mode conversion at master outdoor unit	Pressure unbalance between outdoor units
				2	Failure of operation mode conversion at slave1 outdoor unit	Pressure unbalance between outdoor units
				3	Failure of operation mode conversion at slave2 outdoor unit	Pressure unbalance between outdoor units
				4	Failure of operation mode conversion at slave3 outdoor unit	Pressure unbalance between outdoor units
	1	7	3	1	Master outdoor unit constant speed compressor fault	Comp locking, check valve leakage, comp dielectric break down at master outdoor unit
				2	Slave1 outdoor unit constant speed compressor fault	Comp locking, check valve leakage, comp dielectric at slave1 outdoor unit
				3	Slave2 outdoor unit constant speed compressor fault	Comp locking, check valve leakage, comp dielectric at slave2 outdoor unit
				4	Slave3 outdoor unit constant speed compressor fault	Comp locking, check valve leakage, comp dielectric at slave3 outdoor unit
	1	9	3	1	Excessive increase of master outdoor unit fan PCB heat sink temperature	Master outdoor unit fan inverter PCB temperature is over 95°C
				2	Excessive increase of slave1 outdoor unit fan PCB heat sink temperature	Slave1 outdoor unit fan inverter PCB temperature is over 95°C
				3	Excessive increase of slave2 outdoor unit fan PCB heat sink temperature	Slave2 outdoor unit fan inverter PCB temperature is over 95°C
				4	Excessive increase of slave3 outdoor unit fan PCB heat sink temperature	Slave3 outdoor unit fan inverter PCB temperature is over 95°C

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	Display				Title	Cause of error
Outdoor unit related error	1	9	4	1	Master outdoor unit fan PCB heat sink temperature sensor error	Master outdoor unit fan PCB heat sink temperature sensor open or short
				2	Slave1 outdoor unit fan PCB heat sink temperature sensor error	Slave1 outdoor unit fan PCB heat sink temperature sensor open or short
				3	Slave2 outdoor unit fan PCB heat sink temperature sensor error	Slave2 outdoor unit fan PCB heat sink temperature sensor open or short
				4	Slave3 outdoor unit fan PCB heat sink temperature sensor error	Slave3 outdoor unit fan PCB heat sink temperature sensor open or short
HR unit related error	2	0	0	1	Searching pipe error	Failure of automatic addressing of valves
	2	0	1	C+#HR	HR unit1 liqiud sensor error	Liquid pipe sensor of HR unit open or short
	2	0	2	C+#HR	HR unit1 sub cooling pipe in sensor error	Sub cooling pipe in sensor of HR unit open or short
	2	0	3	C+#HR	HR unit1 sub cooling pipe out sensor error	Sub cooling pipe out sensor of HR unit. open or short
	2	0	4	C+#HR	Communication error	Failing to receive HR unit signal at outdoor unit

C: HR unit
#: HR unit nuber

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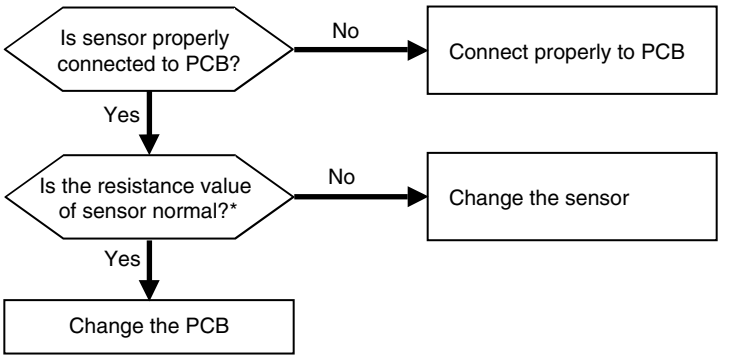
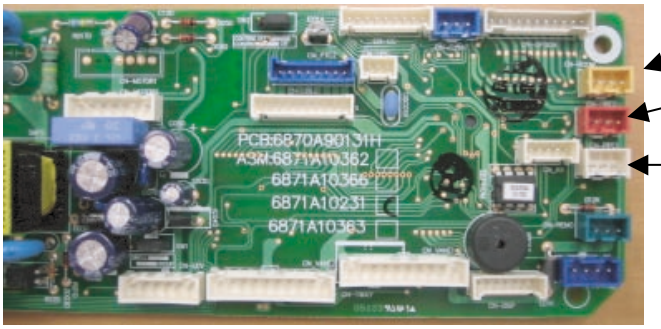
Error No.	Error type	Error point	Main reasons
01	Indoor unit air sensor error	Indoor unit sensor is open/short	1. Indoor unit PCB wrong connection 2. Indoor unit PCB failure 3. Sensor problem (main reason)
02	Indoor unit pipe inlet sensor error		
06	Indoor unit pipe outlet sensor error		

■ Error diagnosis and countermeasure flow chart



** In case the value is more than 100kΩ (open) or less than 100Ω (short), error occurs

Refer: Resistance value maybe change according to temperature of temp sensor,
It shows according to criteria of current temperature(±5% margin) ➔ Normal
Air temp sensor: 10°C = 20.7kΩ : 25°C= 10kΩ : 50°C= 3.4kΩ
Pipe temp sensor: 10°C = 10kΩ : 25°C= 5kΩ : 50°C= 1.8kΩ



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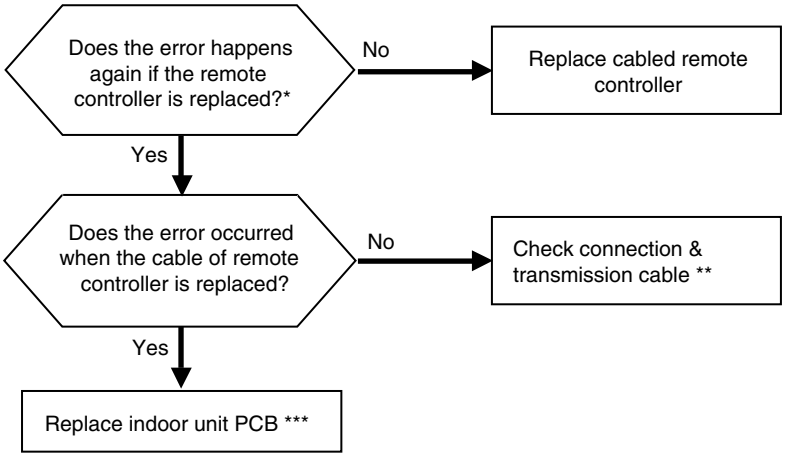
Error No.	Error type	Error point	Main reasons
03	No transmission between cabled remote controller & indoor unit	The remote controller did not receive the signal from indoor unit during specific time	1. Remote controller failure 2. Indoor unit PCB failure 3. Connector failure, Wrong connection 4. transmission cable problem

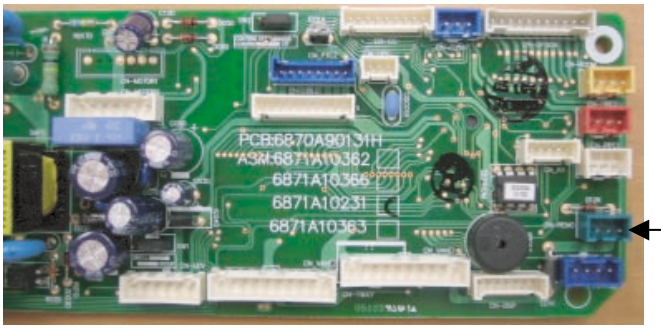
■ Error diagnosis and countermeasure flow chart


Does the error happens again if the remote controller is replaced?*
No
Replace cabled remote controller
Yes
Does the error occurred when the cable of remote controller is replaced?
No
Check connection & transmission cable **
Yes
Replace indoor unit PCB ***

* If there is no remote controller to replace : Use another unit's remote controller doing well

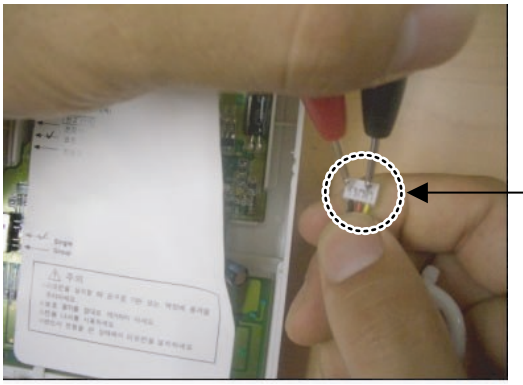
** Check cable : Contact failure of connected portion or extension of cable are main cause
check any surrounded noise (check the distance with main power cable)
➔ make safe distance from the devices generate electromagnetic wave

*** After replacing indoor unit PCB, do auto addressing & input unit's address if connected to central controller.
(All the indoor units connected should be turned on before auto addressing



CN-REMO : Remote controller connection

※ The PCB can differ from model to model.
Check from the right source.



Checking transmission cable connection status

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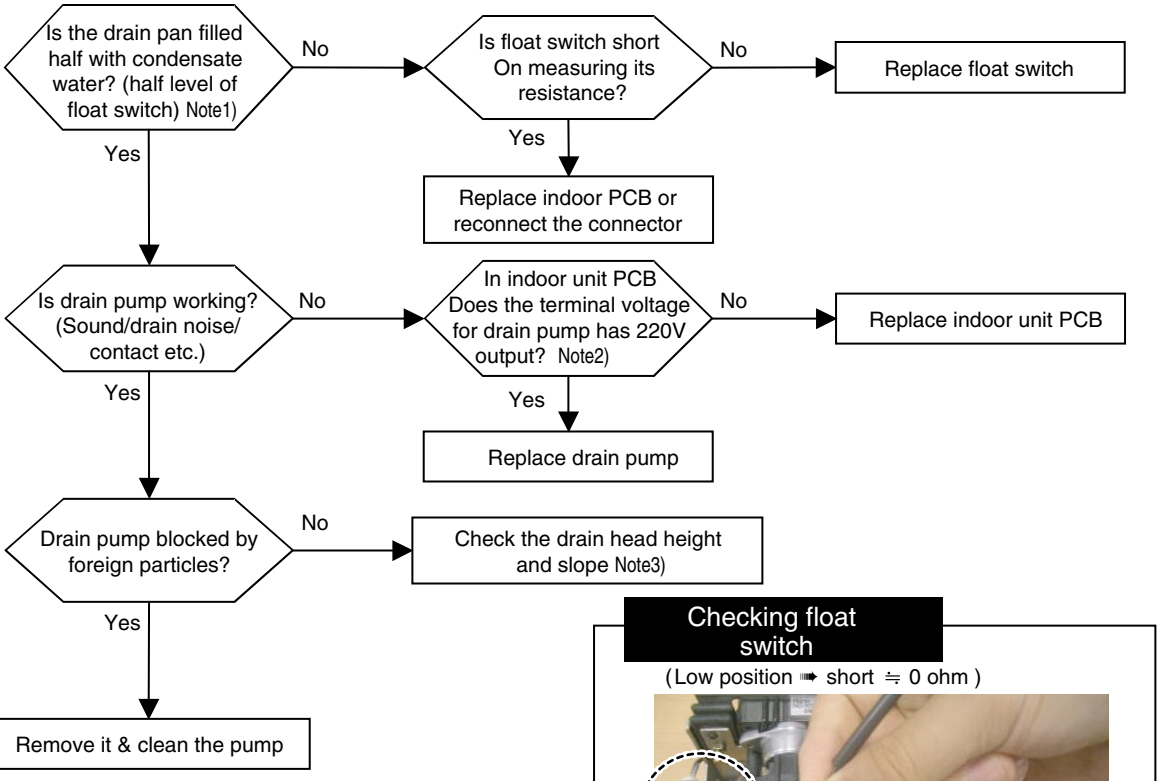
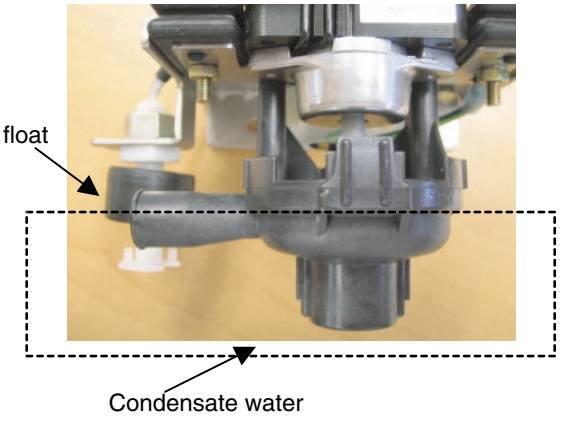
Error No.	Error type	Error point	Main reasons
04	Drain pump error	Float switch is open due to rising of condensate water level because of drain pump failure or drain pipe clogging	1. Drain pump/float switch failure 2. Improper drain pipe location, clogging of drain pipe 3. Indoor unit PCB failure

■ Error diagnosis and countermeasure flow chart


Is the drain pan filled half with condensate water? (half level of float switch) Note1)
No
Is float switch short On measuring its resistance?
No
Replace float switch
Yes
Yes
Replace indoor PCB or reconnect the connector
Is drain pump working? (Sound/drain noise/ contact etc.)
No
In indoor unit PCB Does the terminal voltage for drain pump has 220V output? Note2)
No
Replace indoor unit PCB
Yes
Yes
Replace drain pump
Drain pump blocked by foreign particles?
No
Check the drain head height and slope Note3)
Yes
Remove it & clean the pump

Note1) If the float goes up higher than a half of float switch then the circuit is open & the unit is stopped automatically.



Checking float switch

(Low position ➠ short ≒ 0 ohm)

(High position ➠ Open)

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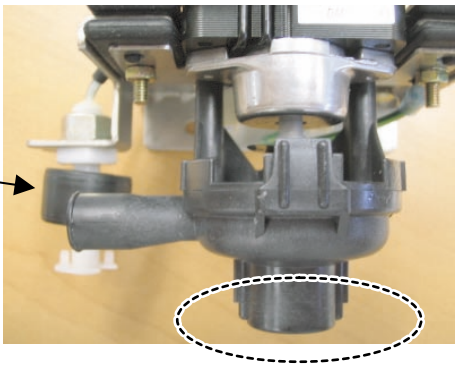
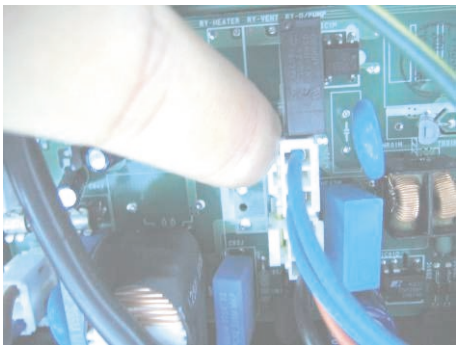


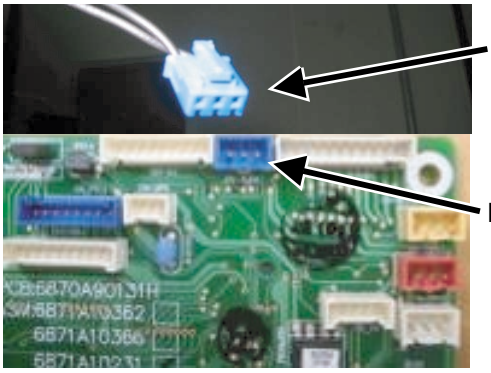
A:Point to check rotating



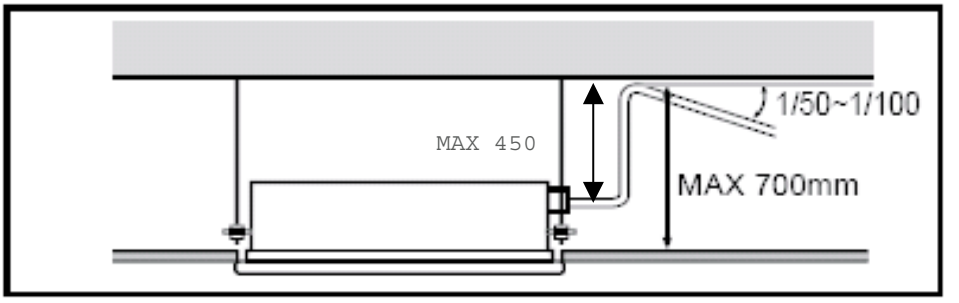
Note 2) Indoor PCB drain pump connector

(Check input of 220V)

(Marked as **CN-DPUMP)**



Note 3) Standard of drain pipe head height / slope



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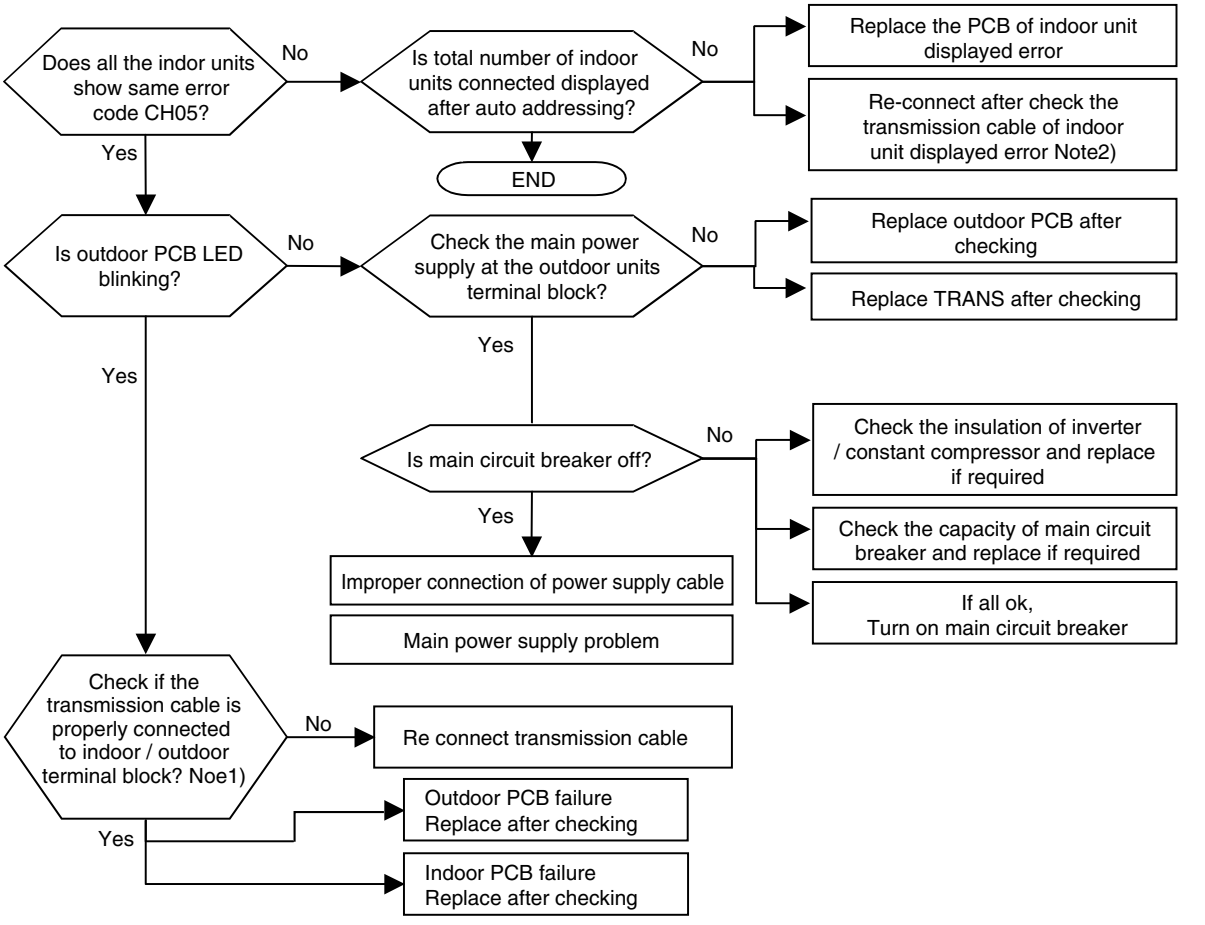
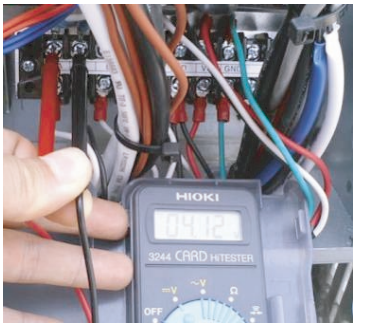
Error No.	Error type	Error point	Main reasons
05	Indoor & outdoor unit transmission error	No signal transmission between indoor & outdoor units.	1. auto addressing is not done 2. transmission cable is not connected 3. Short circuit of transmission cable 4. Indoor unit transmission circuit failure 5. outdoor unit transmission circuit failure 6. Not enough distance between power and transmission cable?

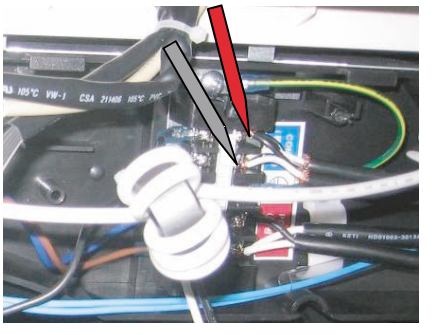
■ Error diagnosis and countermeasure flow chart


Does all the indor units show same error code CH05?
No
Is total number of indoor units connected displayed after auto addressing?
No
Replace the PCB of indoor unit displayed error
Re-connect after check the transmission cable of indoor unit displayed error Note2)
Yes
END
Is outdoor PCB LED blinking?
No
Check the main power supply at the outdoor units terminal block?
No
Replace outdoor PCB after checking
Replace TRANS after checking
Yes
Yes
Is main circuit breaker off?
No
Check the insulation of inverter / constant compressor and replace if required
Yes
Check the capacity of main circuit breaker and replace if required
Improper connection of power supply cable
If all ok, Turn on main circuit breaker
Main power supply problem
Check if the transmission cable is properly connected to indoor / outdoor terminal block? Noe1)
No
Re connect transmission cable
Outdoor PCB failure Replace after checking
Yes
Indoor PCB failure Replace after checking

Note1) Transmission from indoor unit is normal if voltage fluctuation(-9V ~ +9V) exists when checking DC voltage of communication terminal between indoor unit and outdoor units



Note 2) If the DC voltage between transmission terminal A, B of indoor unit is fluctuate within (-9V~+9V) then transmission from outdoor unit is normal



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Error No.	Error type	Error point	Main reasons
06	Indoor unit outlet pipe temperature sensor error	Indoor unit outlet pipe temperature sensor open or short	Refer to CH02

Error No.	Error type	Error point	Main reasons
09	Indoor unit EEPROM error		1. Error developed in transmission between the micro- processor and the EEPROM on the surface of the PCB. 2. ERROR due to the EEPROM damage

■ Error diagnosis and countermeasure flow chart

- Replace the indoor unit PCB, and then make sure to perform auto addressing and input the address of central control

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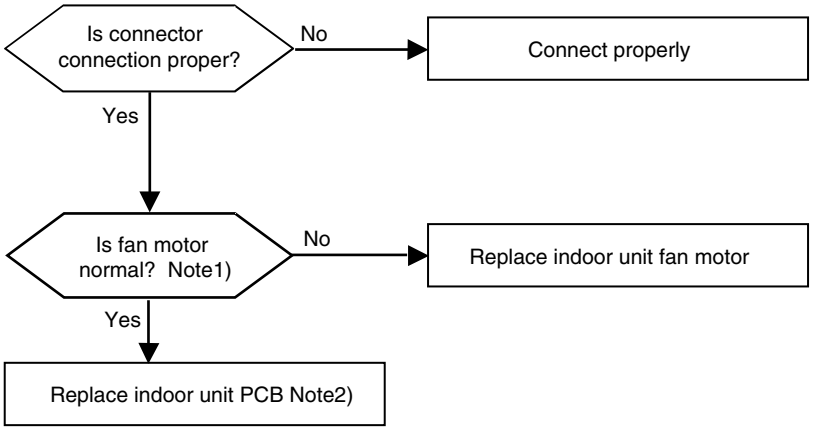
Error No.	Error type	Error point	Main reasons
10	Indoor unit BLDC fan motor failure	Indoor BLDC fan motor feedback signal is absent (for 50 sec.)	1. Motor connector connection failure 2. Indoor PCB failure 3. Motor failure

■ Error diagnosis and countermeasure flow chart

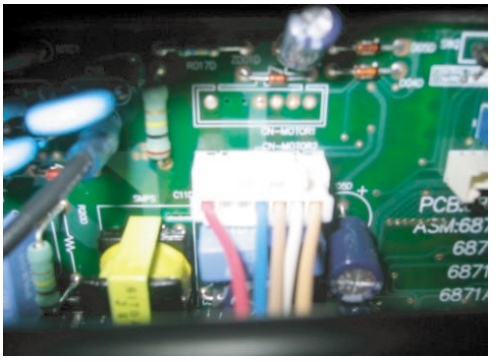


Note1) It is normal when check hall sensor of indoor fan motor as shown below

Each termainl with the tester

Tester		Normal resistance(±10%)	
+	-	TH chassis	TD chassis
①	④	∞	∞
⑤	④	hundreds kΩ	hundreds kΩ
⑥	④	∞	∞
⑦	④	hundreds kΩ	hundreds kΩ

<Checking connection state of fan motor connector>



Note2) Replace the indoor unit PCB, and then make sure to do Auto addressing and input the address of central control
(Notice: The connection of motor connector to PCB should be done under no power supplying to PCB)

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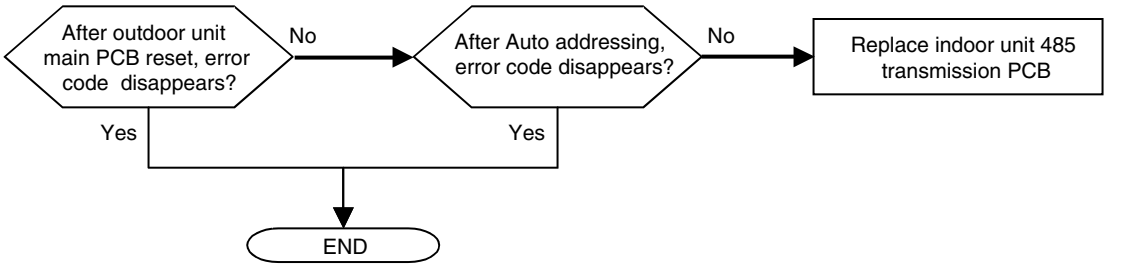
Error No.	Error type	Error point	Main reasons
11	Indoor unit transmission error	Indoor unit doesn't get signal from outdoor unit for 3 minutes continuously	1. Indoor 485 transmission PCB failure 2. After PCB replacing, auto addressing was not done

■ Error diagnosis and countermeasure flow chart



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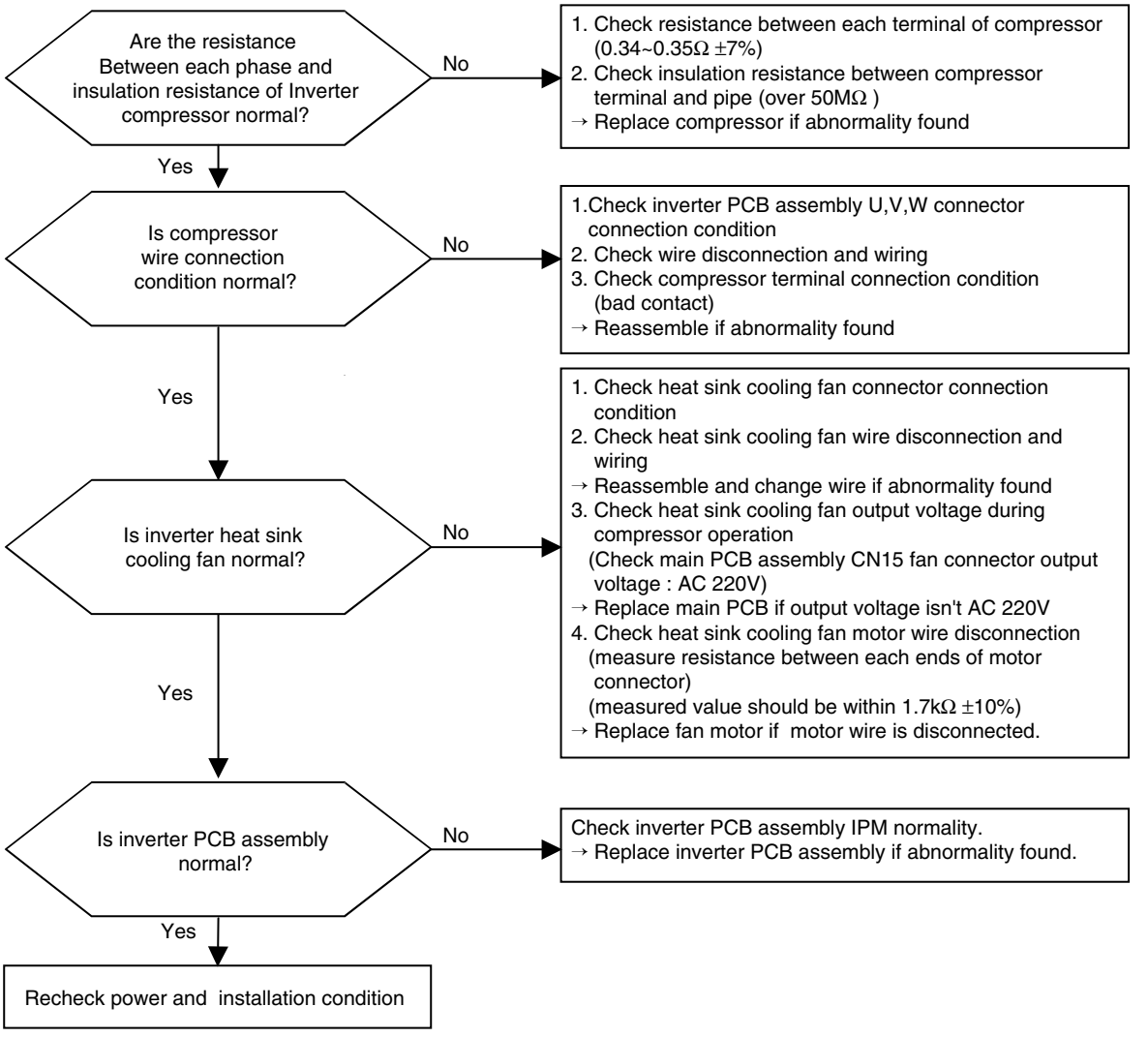
Error No.	Error type	Error point	Main reasons
21* Master 211 Slave1 212 Slave2 213	Inverter PCB Assy IPM failure occur	IPM self protection circuit activation (Overcurrent/IPM overheating/Vcc low voltage)	1.Over current detection at Inverter compressor(U,V,W) 2.Compressor damaged (insulation damaged/Motor damaged) 3.IPM overheating (Heat sink fan damaged/Heat sink fan connector disconnected/Heat sink disassembled) 4.Inverter compressor terminal disconnected or loose 5.Inverter PCB assembly damaged 6.Outdoor unitinput current low

■ Error diagnosis and countermeasure flow chart


Are the resistance Between each phase and insulation resistance of Inverter compressor normal?
No
1. Check resistance between each terminal of compressor (0.34~0.35Ω ±7%)
2. Check insulation resistance between compressor terminal and pipe (over 50MΩ)
→ Replace compressor if abnormality found
Yes
Is compressor wire connection condition normal?
No
1.Check inverter PCB assembly U,V,W connector connection condition
2. Check wire disconnection and wiring
3. Check compressor terminal connection condition (bad contact)
→ Reassemble if abnormality found
Yes
Is inverter heat sink cooling fan normal?
No
1. Check heat sink cooling fan connector connection condition
2. Check heat sink cooling fan wire disconnection and wiring
→ Reassemble and change wire if abnormality found
3. Check heat sink cooling fan output voltage during compressor operation
(Check main PCB assembly CN15 fan connector output voltage : AC 220V)
→ Replace main PCB if output voltage isn't AC 220V
4. Check heat sink cooling fan motor wire disconnection
(measure resistance between each ends of motor connector)
(measured value should be within 1.7kΩ ±10%)
→ Replace fan motor if motor wire is disconnected.
Yes
Is inverter PCB assembly normal?
No
Check inverter PCB assembly IPM normality.
→ Replace inverter PCB assembly if abnormality found.
Yes
Recheck power and installation condition

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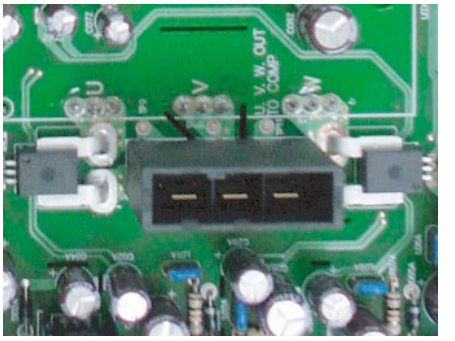
* Measuring resistance between each terminal of compressor

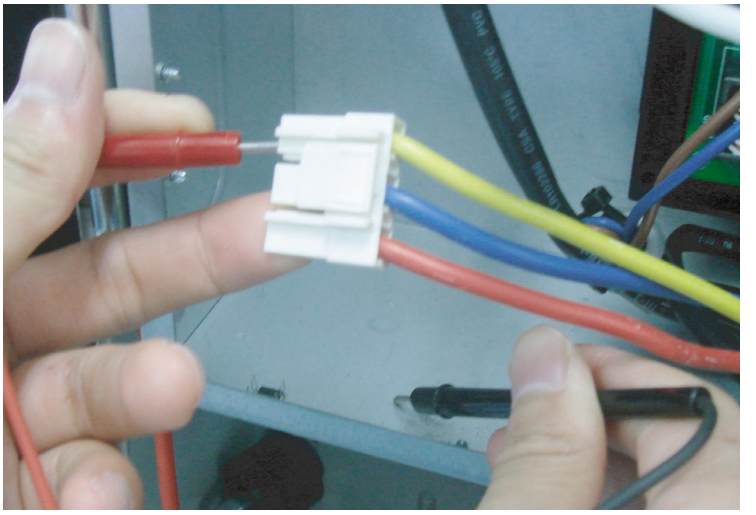
* Heat sink cooling fan connector

* Compressor wire connector connection point

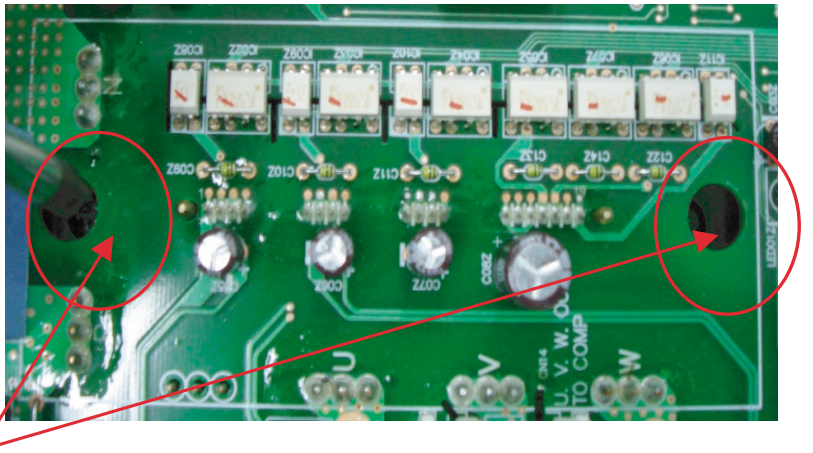


* Heat sink cooling fan

* Measuring insulation resistance between compressor output terminal and chassis



* IPM joining point



Check joining conditon

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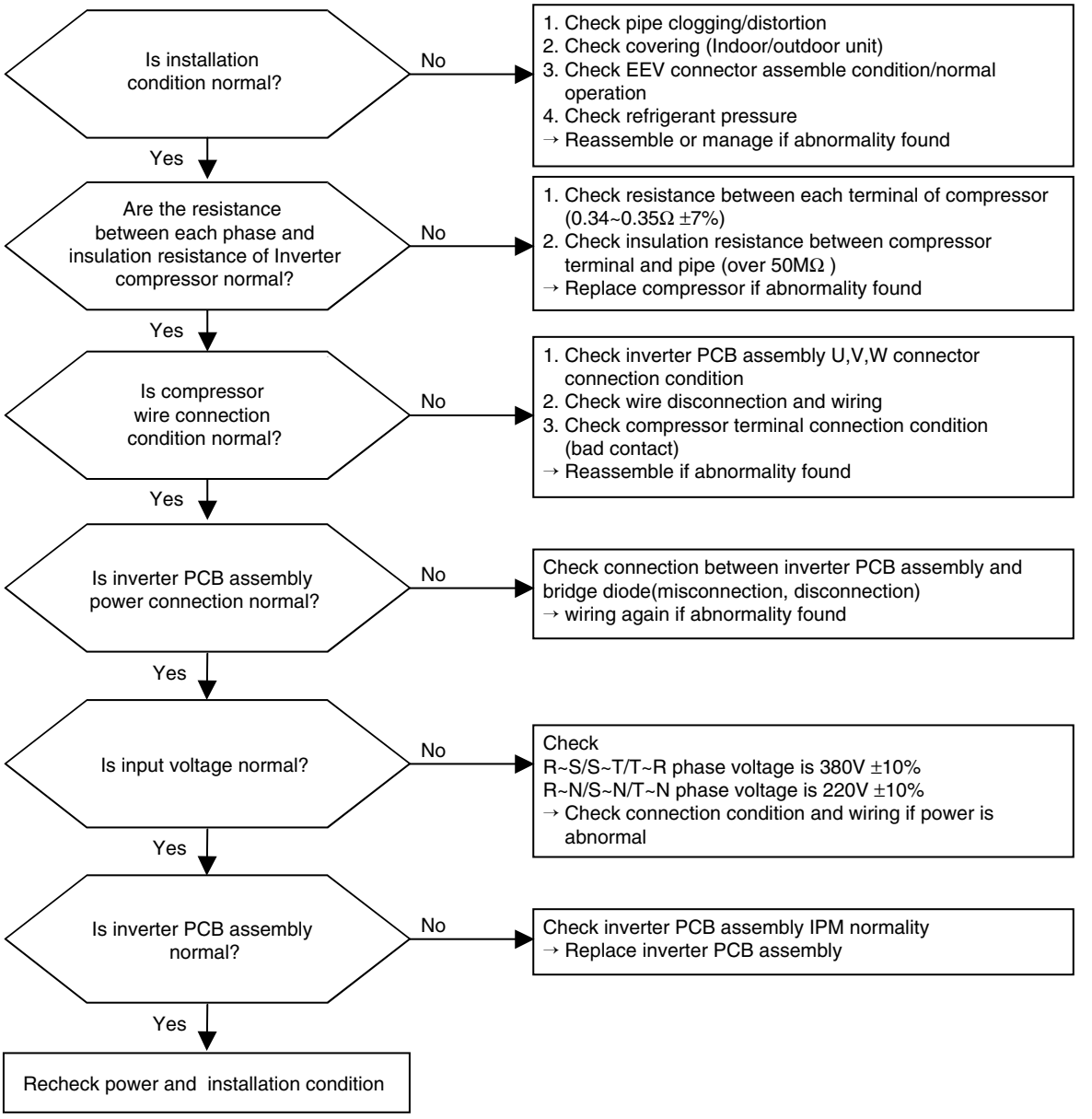
Error No.	Error type	Error point	Main reasons
22* Master 221 Slave1 222 Slave2 223	AC input current over error	Inverter PCB assembly input 3 phase power current is over limited value(22A)	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. Power line misconnection 5. Inverter PCB assembly damage (Input current sensing part)

■ Error diagnosis and countermeasure flow chart


Is installation condition normal?
No
1. Check pipe clogging/distortion
2. Check covering (Indoor/outdoor unit)
3. Check EEV connector assemble condition/normal operation
4. Check refrigerant pressure
→ Reassemble or manage if abnormality found
Yes
Are the resistance between each phase and insulation resistance of Inverter compressor normal?
No
1. Check resistance between each terminal of compressor (0.34~0.35Ω ±7%)
2. Check insulation resistance between compressor terminal and pipe (over 50MΩ)
→ Replace compressor if abnormality found
Yes
Is compressor wire connection condition normal?
No
1. Check inverter PCB assembly U,V,W connector connection condition
2. Check wire disconnection and wiring
3. Check compressor terminal connection condition (bad contact)
→ Reassemble if abnormality found
Yes
Is inverter PCB assembly power connection normal?
No
Check connection between inverter PCB assembly and bridge diode(misconnection, disconnection)
→ wiring again if abnormality found
Yes
Is input voltage normal?
No
Check
R~S/S~T/T~R phase voltage is 380V ±10%
R~N/S~N/T~N phase voltage is 220V ±10%
→ Check connection condition and wiring if power is abnormal
Yes
Is inverter PCB assembly normal?
No
Check inverter PCB assembly IPM normality
→ Replace inverter PCB assembly
Yes
Recheck power and installation condition

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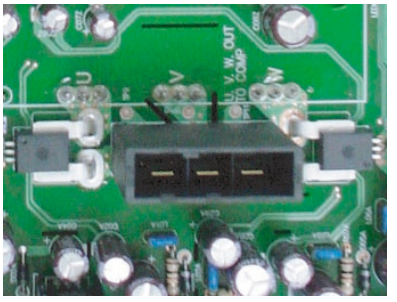
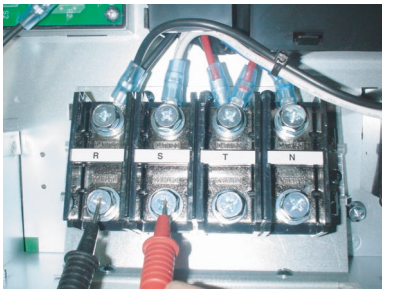
* Measuring resistance between each terminal of compressor

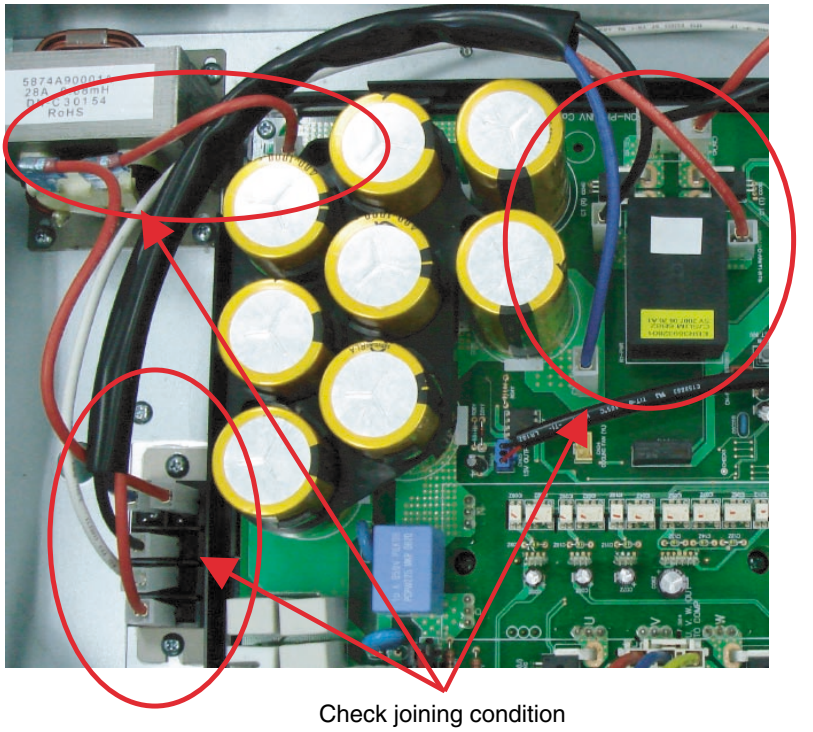
* Compressor wire connector connection



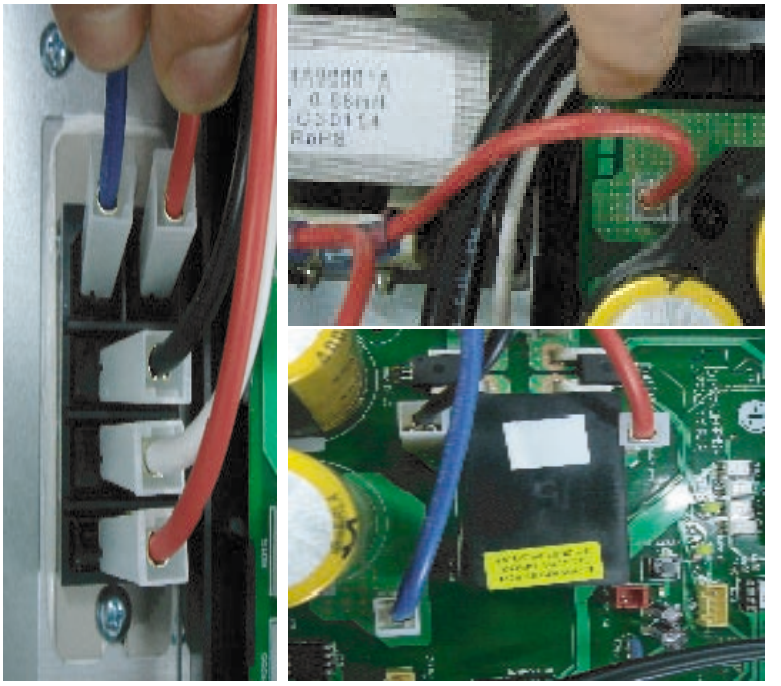
* Measuring input voltage



* Inverter PCB & bridge diode wiring



Check joining condition



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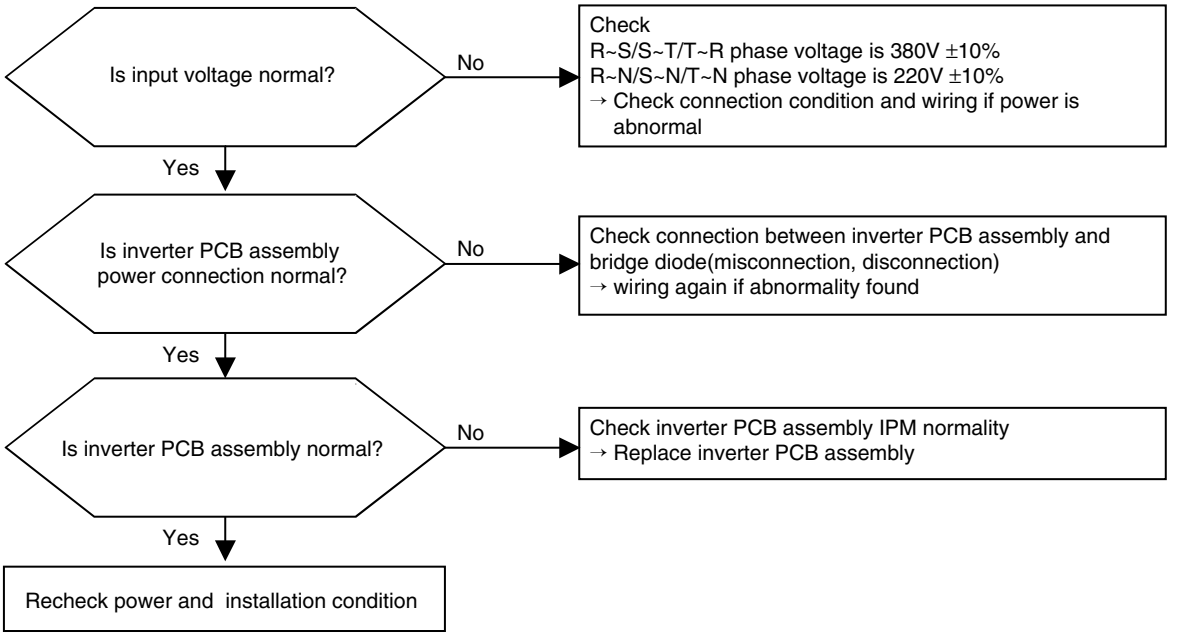
Error No.	Error type	Error point	Main reasons
23* Master 231 Slave1 232 Slave2 233	Inverter compressor DC link low voltage	DC voltage isn't charged after starting relay on	1. DC link terminal misconnection/terminal contact failure 2. Starting relay damage 3. Condenser damage 4. Inverter PCB assembly damage (DC link voltage sensing part) 5. Input voltage low

■ Error diagnosis and countermeasure flow chart


Is input voltage normal?
No
Check
R~S/S~T/T~R phase voltage is 380V ±10%
R~N/S~N/T~N phase voltage is 220V ±10%
→ Check connection condition and wiring if power is abnormal
Yes
Is inverter PCB assembly power connection normal?
No
Check connection between inverter PCB assembly and bridge diode(misconnection, disconnection)
→ wiring again if abnormality found
Yes
Is inverter PCB assembly normal?
No
Check inverter PCB assembly IPM normality
→ Replace inverter PCB assembly
Yes
Recheck power and installation condition

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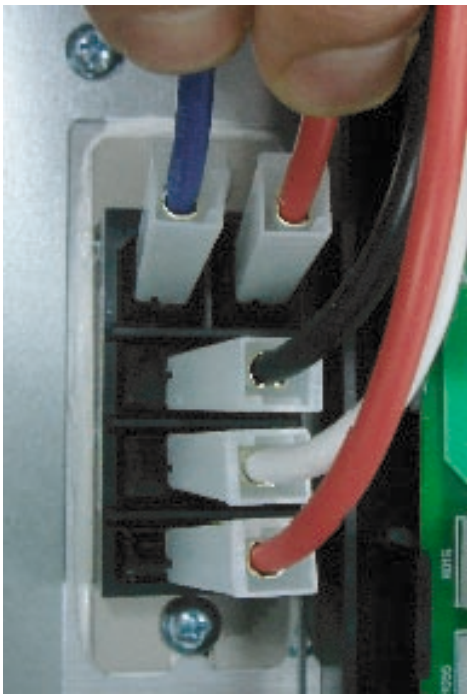
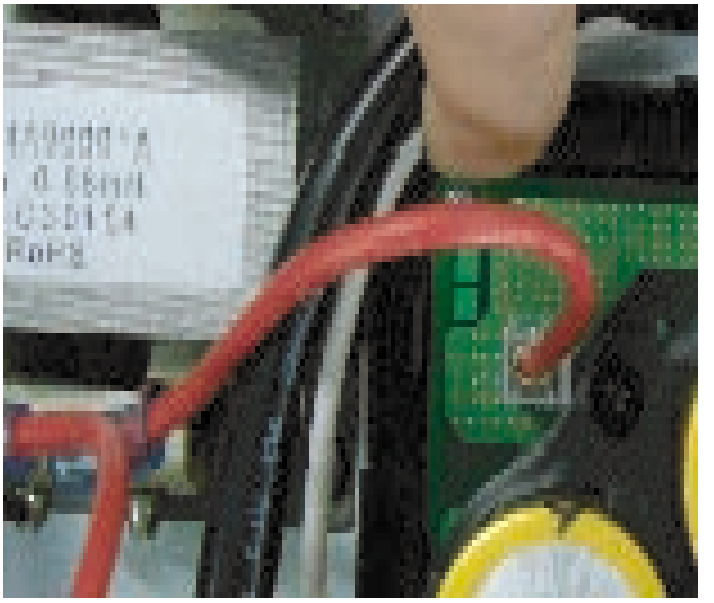
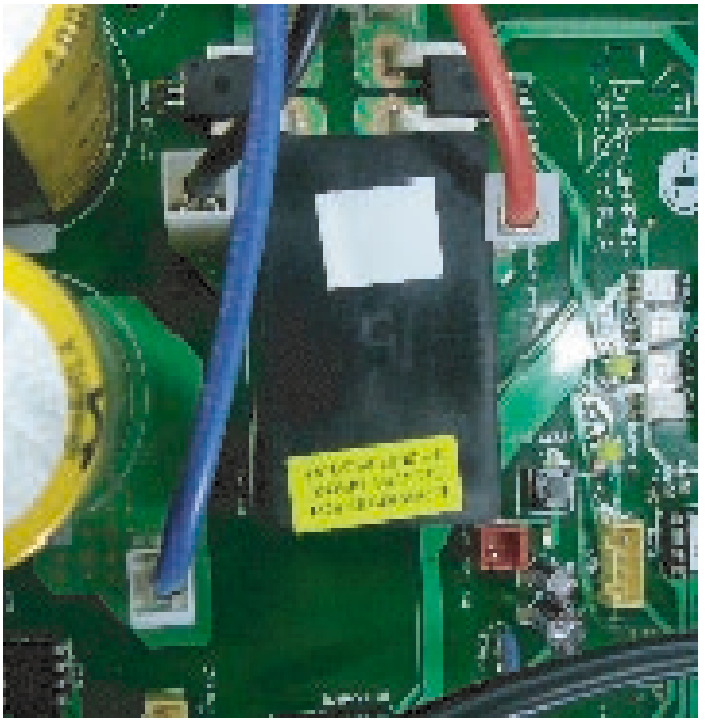
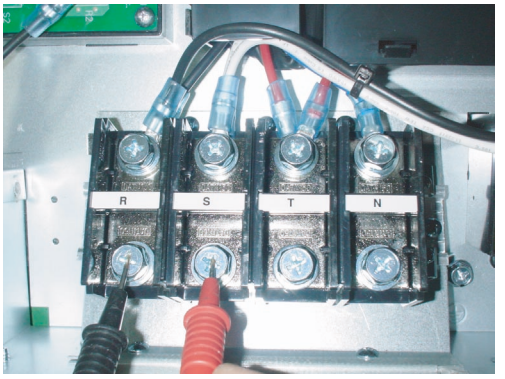
* Inverter PCB & bridge diode wiring







* Measuring input voltage



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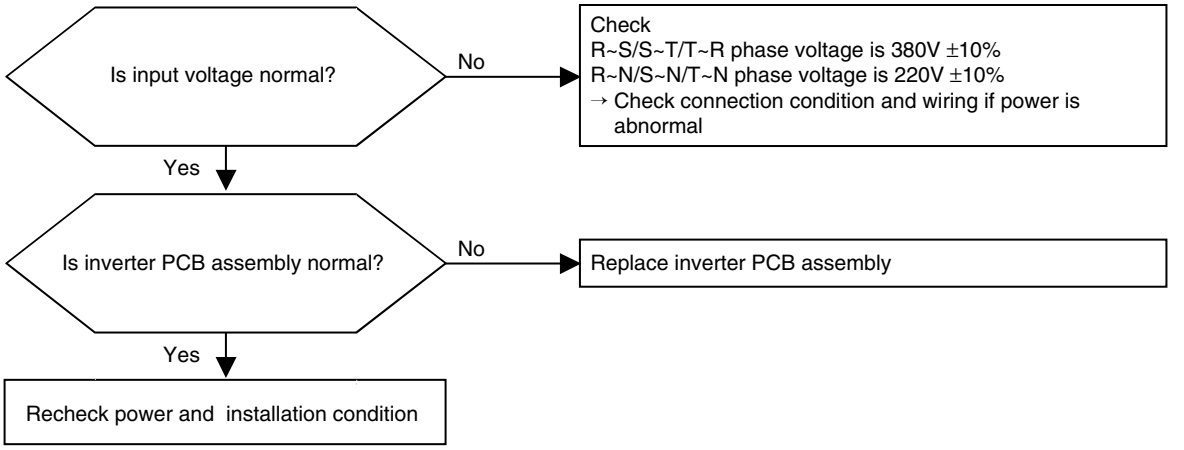
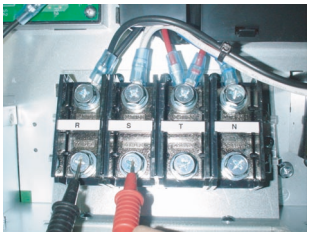
Error No.	Error type	Error point	Main reasons
25* Master 251 Slave1 252 Slave2 253	Input voltage high/low	Input voltage is over limited value of the product (173V or less, 289V or more)	1. Input voltage abnormal (T-N) 2. Outdoor unit inverter PCB assembly damage (input voltage sensing part)

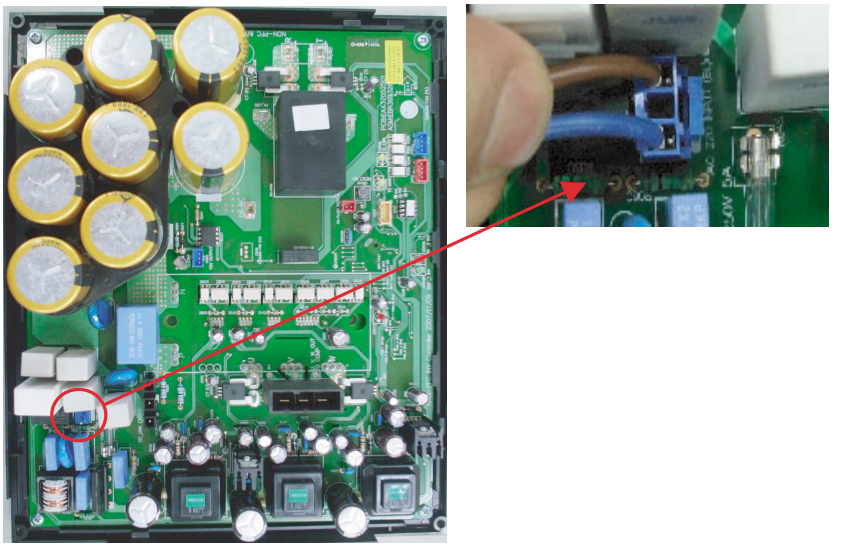
■ Error diagnosis and countermeasure flow chart



* Measuring input voltage



* Inverter PCB assembly power wiring



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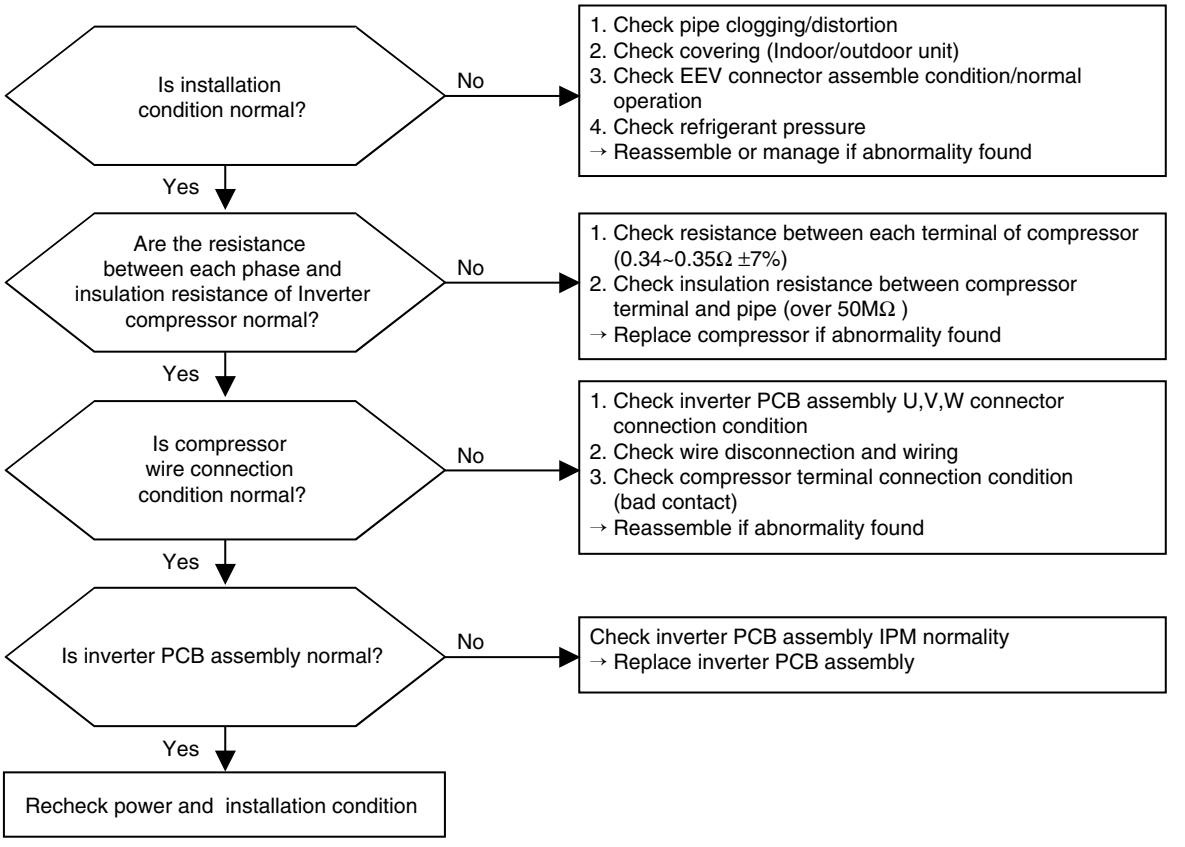
Error No.	Error type	Error point	Main reasons
26* Master 261 Slave1 262 Slave2 263	Inverter compressor starting failure error	Starting failure because of compressor abnormality	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage (Insulation damage/Motor damage) 3. Compressor wiring failure 4. Outdoor unit inverter PCB damage (CT)

■ Error diagnosis and countermeasure flow chart


Is installation condition normal?
No
1. Check pipe clogging/distortion
2. Check covering (Indoor/outdoor unit)
3. Check EEV connector assemble condition/normal operation
4. Check refrigerant pressure
→ Reassemble or manage if abnormality found
Yes
Are the resistance between each phase and insulation resistance of Inverter compressor normal?
No
1. Check resistance between each terminal of compressor (0.34~0.35Ω ±7%)
2. Check insulation resistance between compressor terminal and pipe (over 50MΩ)
→ Replace compressor if abnormality found
Yes
Is compressor wire connection condition normal?
No
1. Check inverter PCB assembly U,V,W connector connection condition
2. Check wire disconnection and wiring
3. Check compressor terminal connection condition (bad contact)
→ Reassemble if abnormality found
Yes
Is inverter PCB assembly normal?
No
Check inverter PCB assembly IPM normality
→ Replace inverter PCB assembly
Yes
Recheck power and installation condition

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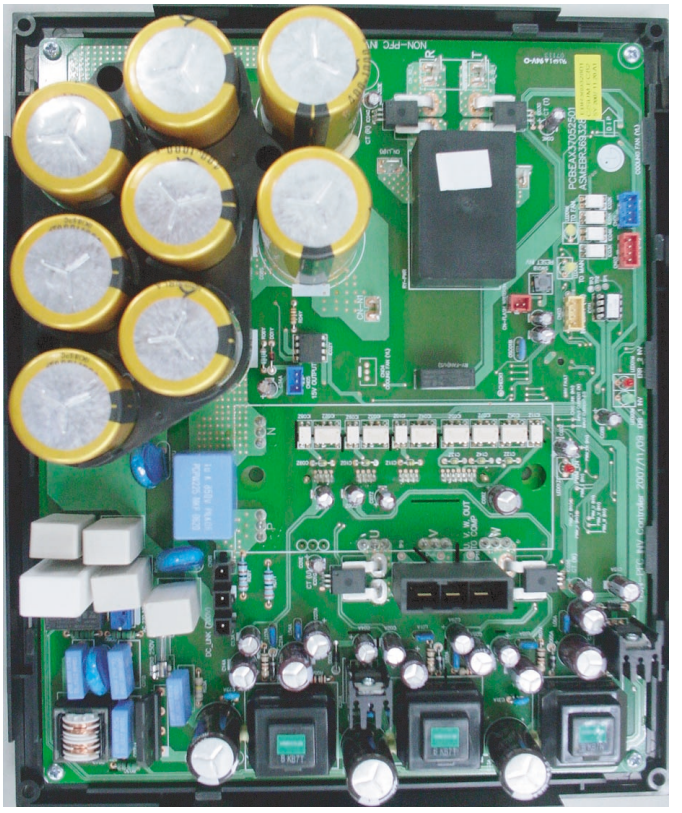
* Measuring resistance between each terminal of compressor

* Compressor wire connection



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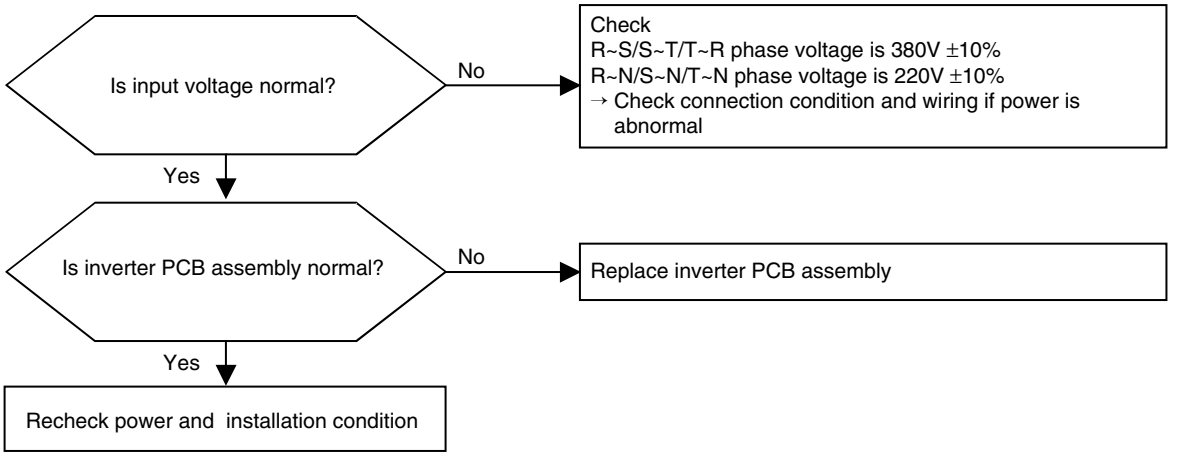
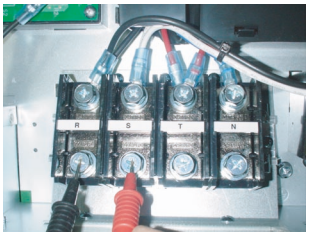
Error No.	Error type	Error point	Main reasons
28* Master 281 Slave1 282 Slave2 283	Inverter DC link high voltage error	Inverter PCB DC link voltage supplied over 780V	1. Input voltage abnormal (R,S,T,N) 2. Outdoor unitinverter PCB damage (DC link voltage sensing part)

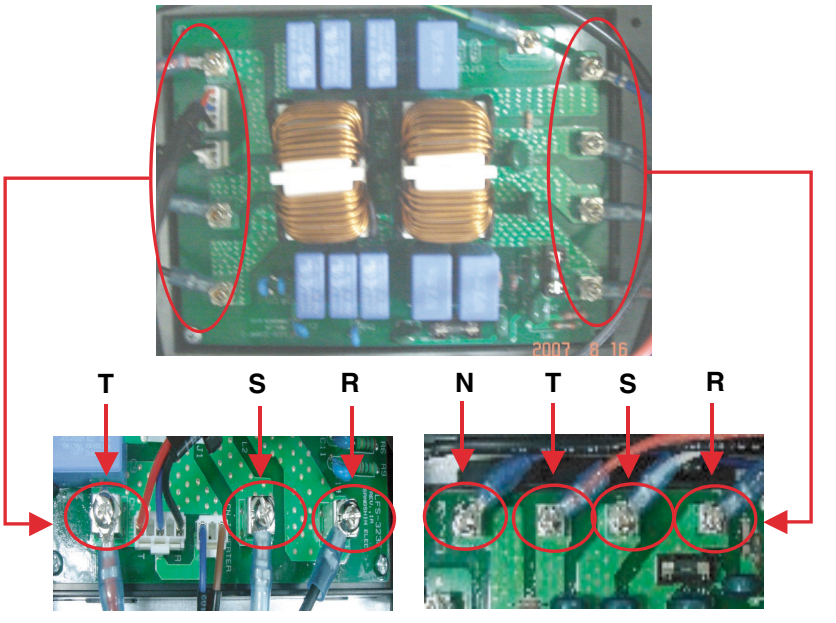
■ Error diagnosis and countermeasure flow chart



* Measuring input voltage



* Noise filter wiring



Noise filter output(lower part)

Noise filter input (upper part)

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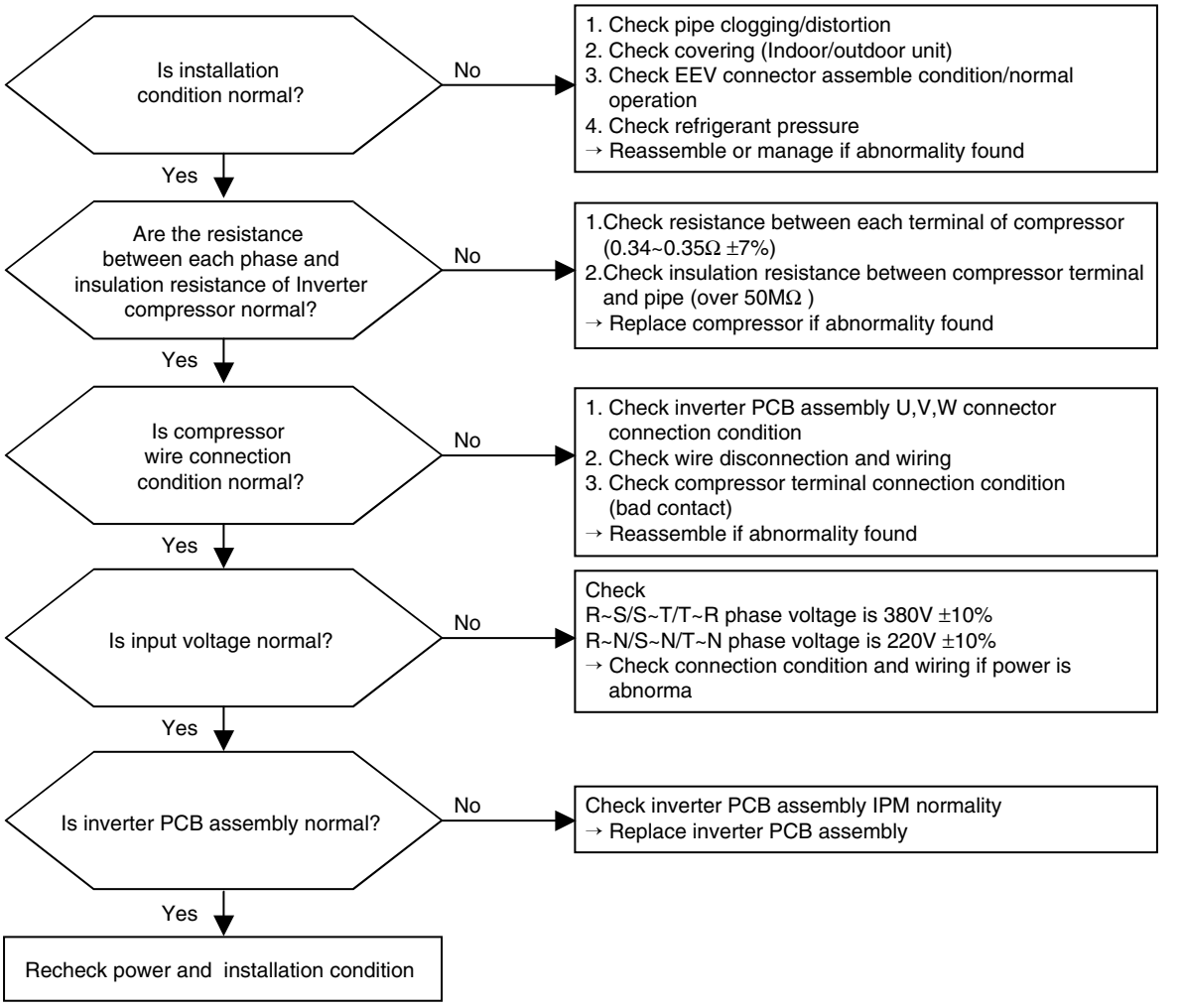
Error No.	Error type	Error point	Main reasons
29* Master 291 Slave1 292 Slave2 293	Inverter compressor over current	Inverter compressor input current is over 30A	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2. Compressor damage(Insulation damage/Motor damage) 3. Input voltage low 4. Outdoor unit inverter PCB assembly damage

■ Error diagnosis and countermeasure flow chart


Is installation condition normal?
No
1. Check pipe clogging/distortion
2. Check covering (Indoor/outdoor unit)
3. Check EEV connector assemble condition/normal operation
4. Check refrigerant pressure
→ Reassemble or manage if abnormality found
Yes
Are the resistance between each phase and insulation resistance of Inverter compressor normal?
No
1.Check resistance between each terminal of compressor (0.34~0.35Ω ±7%)
2.Check insulation resistance between compressor terminal and pipe (over 50MΩ)
→ Replace compressor if abnormality found
Yes
Is compressor wire connection condition normal?
No
1. Check inverter PCB assembly U,V,W connector connection condition
2. Check wire disconnection and wiring
3. Check compressor terminal connection condition (bad contact)
→ Reassemble if abnormality found
Yes
Is input voltage normal?
No
Check
R~S/S~T/T~R phase voltage is 380V ±10%
R~N/S~N/T~N phase voltage is 220V ±10%
→ Check connection condition and wiring if power is abnorma
Yes
Is inverter PCB assembly normal?
No
Check inverter PCB assembly IPM normality
→ Replace inverter PCB assembly
Yes
Recheck power and installation condition

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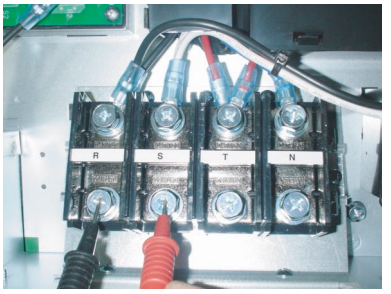
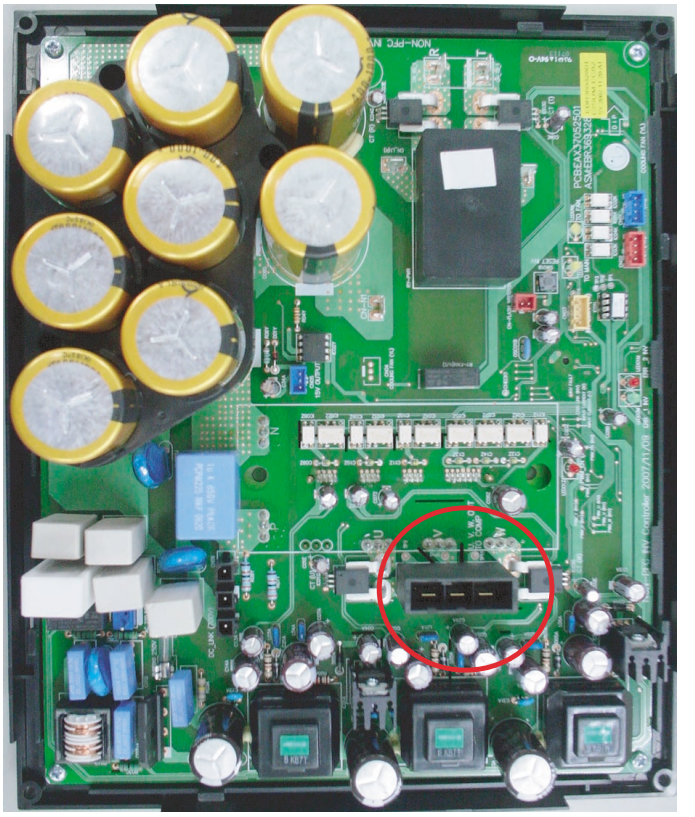
*** Measuring resistance between each terminal of compressor**

*** Measuring input voltage**



*** Compressor wire connection**



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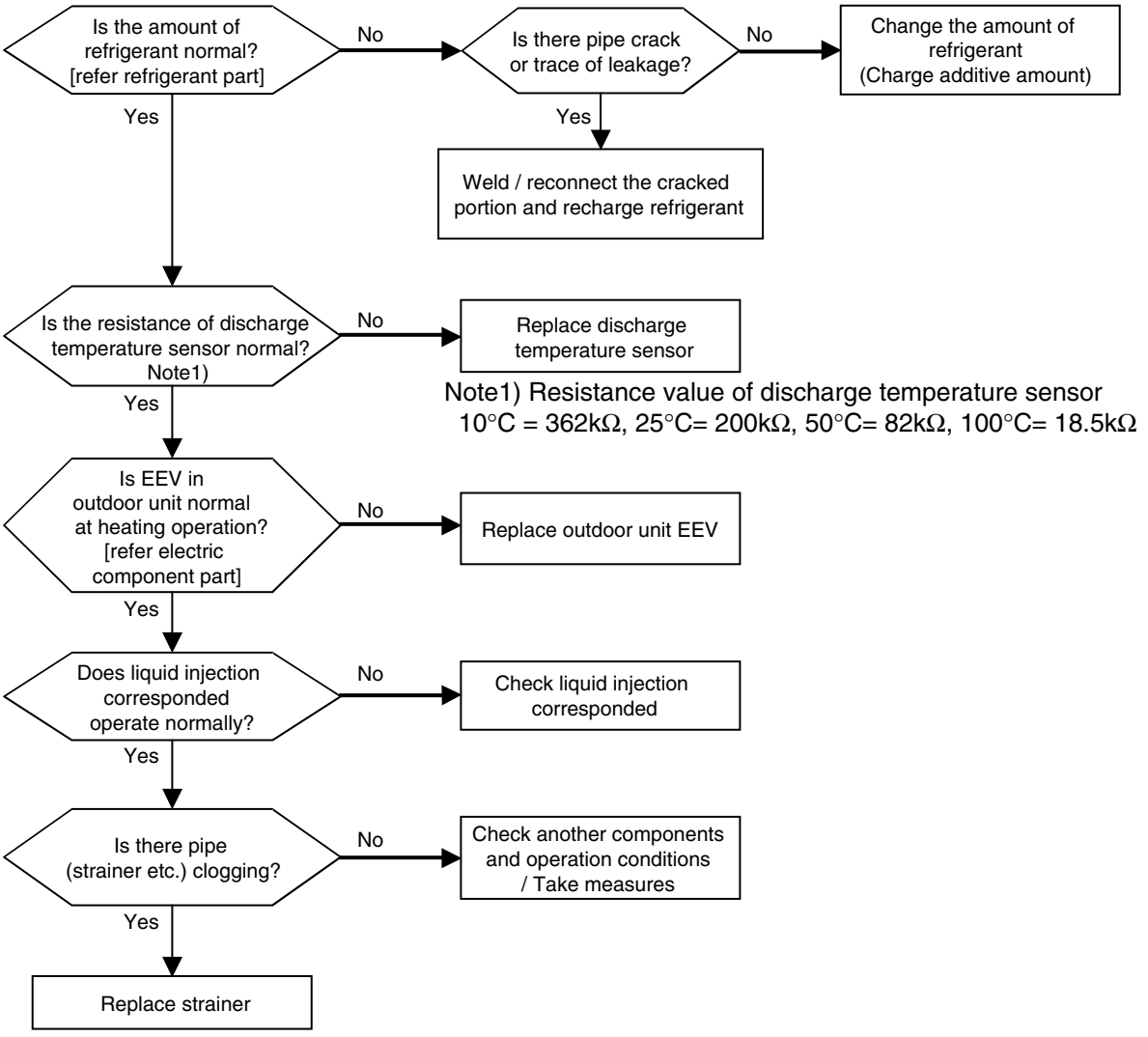
Error No.	Error type	Error point	Main reasons
32* Master 321 Slave1 322 Slave2 323	Over-increasing of discharge temperature of inverter compressor	Compressor is off because of over-increase discharge temperature of inverter compressor	1. Temperature sensor defect of inverter compressor discharge pipe 2. Refrigerant shortage / leak 3. EEV defect 4. Liquid injection valve defect
33* Master 331 Slave1 332 Slave2 333	Over-increase of discharge temperature of constant speed compressor	Compressor is off because of over-increase discharge temperature of constant compressor at main and sub outdoor unit	1. Temperature sensor defect of constant compressor discharge pipe? 2. Refrigerant shortage/leak 3. EEV defect 4. Liquid injection valve defect

■ Error diagnosis and countermeasure flow chart


Is the amount of refrigerant normal? [refer refrigerant part]
No
Is there pipe crack or trace of leakage?
No
Change the amount of refrigerant (Charge additive amount)
Yes
Yes
Weld / reconnect the cracked portion and recharge refrigerant
Is the resistance of discharge temperature sensor normal? Note1)
No
Replace discharge temperature sensor
Yes
Is EEV in outdoor unit normal at heating operation? [refer electric component part]
No
Replace outdoor unit EEV
Yes
Does liquid injection corresponded operate normally?
No
Check liquid injection corresponded
Yes
Is there pipe (strainer etc.) clogging?
No
Check another components and operation conditions / Take measures
Yes
Replace strainer

Note1) Resistance value of discharge temperature sensor
10°C = 362kΩ, 25°C= 200kΩ, 50°C= 82kΩ, 100°C= 18.5kΩ

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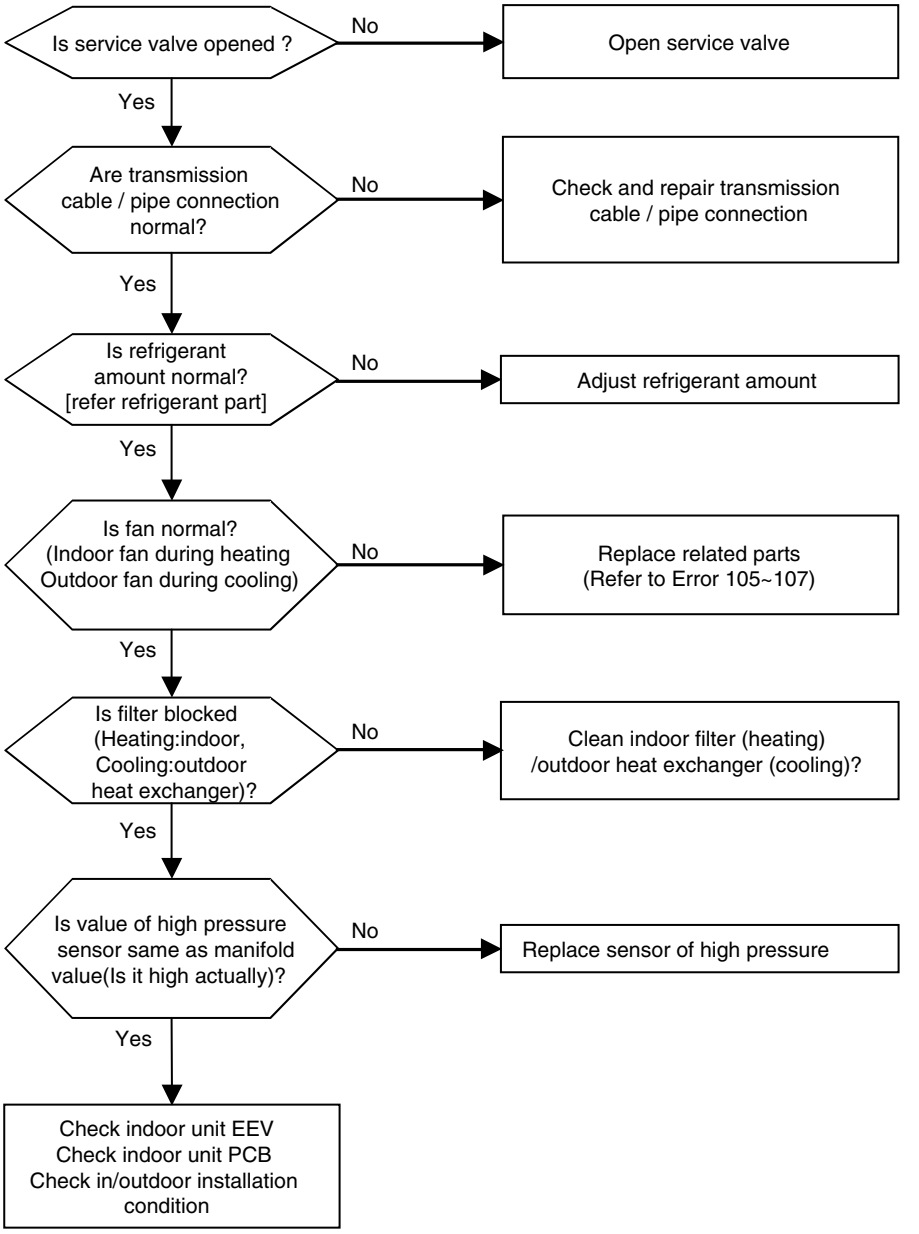
Error No.	Error type	Error point	Main reasons
34* Master 341 Slave1 342 Slave2 343	Over-increase of discharge pressure of compressor	Error happens because of 3 times successive compressor off due to over-increase of high pressure by high pressure sensor	1. Defect of high pressure sensor 2. Defect of indoor or outdoor unit fan 3. Deformation because of damage of refrigerant pipe 4. Over-charged refrigerant 5. Defective indoor / outdoor unit EEV 6. When blocked - outdoor unit is blocked during cooling - Indoor unit filter is blocked during heating 7. SVC valve is clogged 8. PCB defect of outdoor unit 10. Indoor unit pipe temperature sensor defect

■ Error diagnosis and countermeasure flow chart


Is service valve opened ?
No
Open service valve
Yes
Are transmission cable / pipe connection normal?
No
Check and repair transmission cable / pipe connection
Yes
Is refrigerant amount normal? [refer refrigerant part]
No
Adjust refrigerant amount
Yes
Is fan normal? (Indoor fan during heating Outdoor fan during cooling)
No
Replace related parts (Refer to Error 105~107)
Yes
Is filter blocked (Heating:indoor, Cooling:outdoor heat exchanger)?
No
Clean indoor filter (heating) /outdoor heat exchanger (cooling)?
Yes
Is value of high pressure sensor same as manifold value(Is it high actually)?
No
Replace sensor of high pressure
Yes
Check indoor unit EEV
Check indoor unit PCB
Check in/outdoor installation condition

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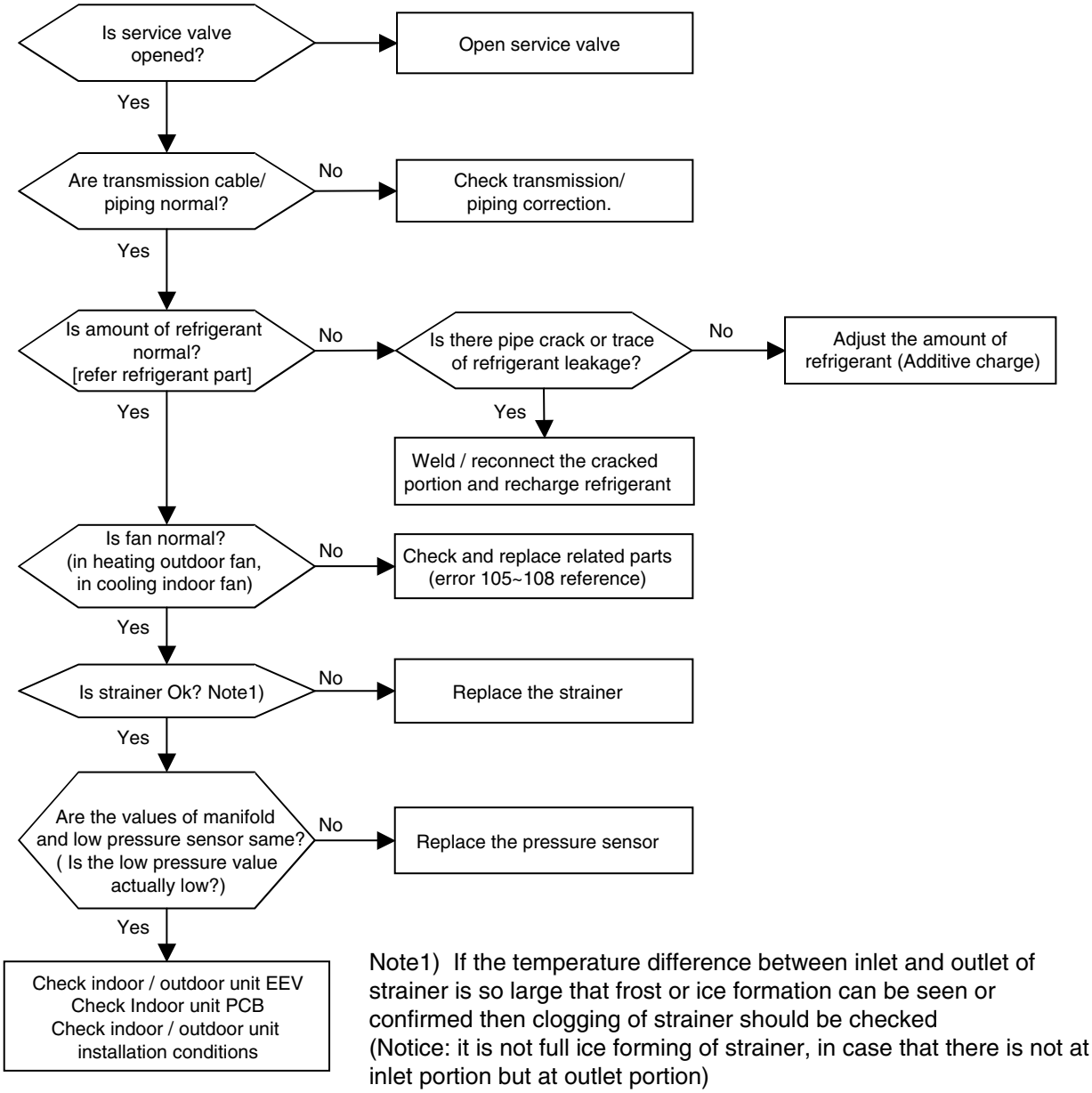
Error No.	Error type	Error point	Main reasons
35* Master 351 Slave1 352 Slave2 353	Excessive drop of discharge pressure of compressor	Error happens because of 3 times successive compressor off due to excessive drop of low pressure by the low pressure sensor	1. Defective low pressure sensor 2. Defective outdoor/indoor unit fan 3. Refrigerant shortage/leakage 4. Deformation because of damage of refrigerant pipe 5. Defective indoor / outdoor unit EEV 6. Covering / clogging (outdoor unit covering during the cooling mode/ indoor unit filter clogging during heating mode) 7. SVC valve clogging 8. Defective outdoor unit PCB 9. Defective indoor unit pipe sensor

■ Error diagnosis and countermeasure flow chart


Is service valve opened?
Open service valve
Yes
Are transmission cable/ piping normal?
No
Check transmission/ piping correction.
Yes
Is amount of refrigerant normal? [refer refrigerant part]
No
Is there pipe crack or trace of refrigerant leakage?
No
Adjust the amount of refrigerant (Additive charge)
Yes
Yes
Weld / reconnect the cracked portion and recharge refrigerant
Is fan normal? (in heating outdoor fan, in cooling indoor fan)
No
Check and replace related parts (error 105~108 reference)
Yes
Is strainer Ok? Note1)
No
Replace the strainer
Yes
Are the values of manifold and low pressure sensor same? (Is the low pressure value actually low?)
No
Replace the pressure sensor
Yes
Check indoor / outdoor unit EEV
Check Indoor unit PCB
Check indoor / outdoor unit installation conditions

Note1) If the temperature difference between inlet and outlet of strainer is so large that frost or ice formation can be seen or confirmed then clogging of strainer should be checked
(Notice: it is not full ice forming of strainer, in case that there is not at inlet portion but at outlet portion)

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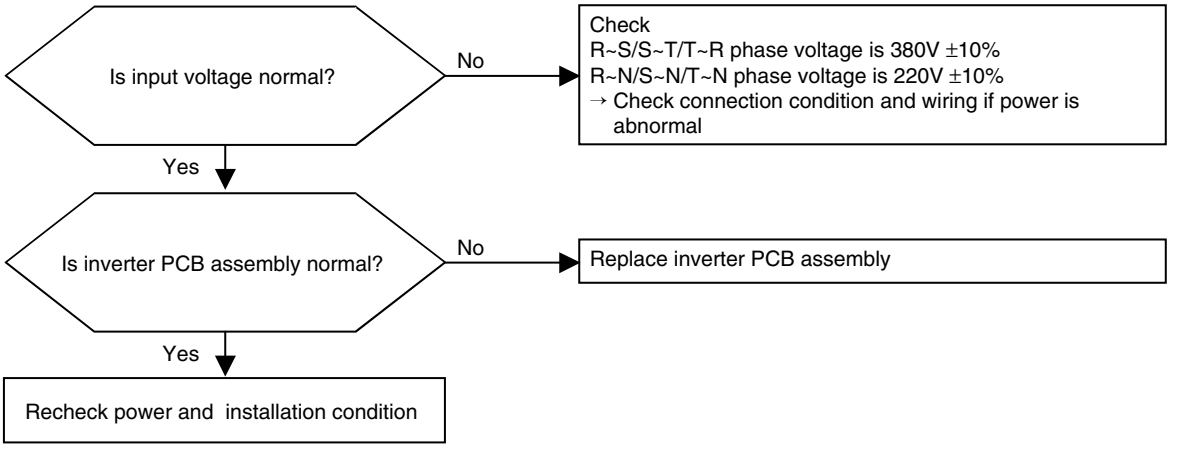
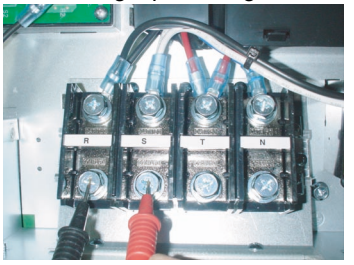
Error No.	Error type	Error point	Main reasons
40* Master 401 Slave1 402 Slave2 403	Inverter compressor CT sensor error	Micom input voltage isn't within 2.5V ±0.3V at initial state of power supply	1. Input voltage abnormal (T-N) 2. Outdoor unitinverter PCB damage (CT sensing part)

■ Error diagnosis and countermeasure flow chart

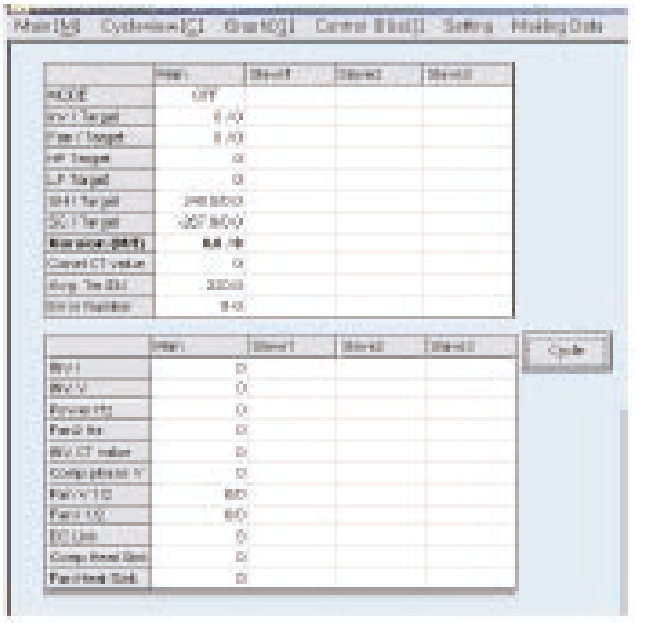


* Measuring input voltage



* Inverter PCB assembly

* LGMV Part



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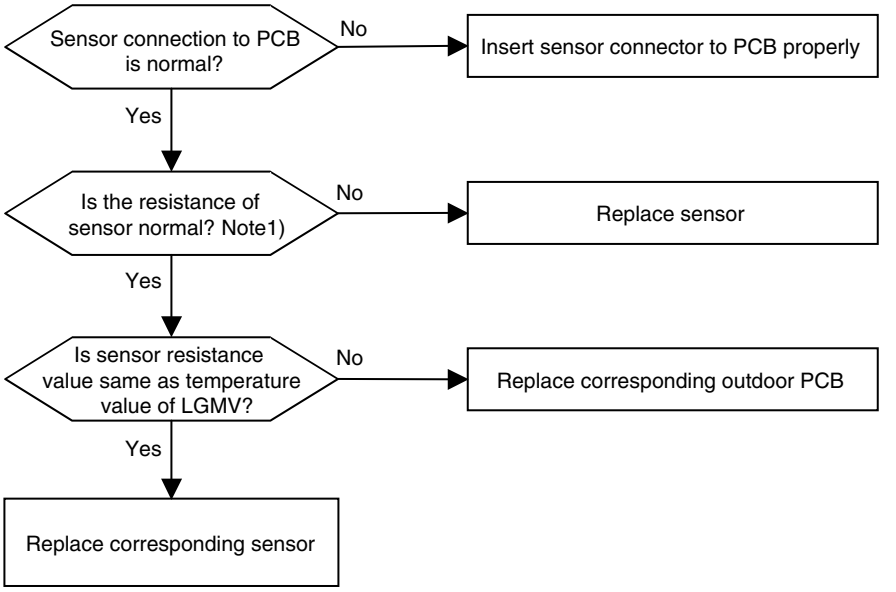
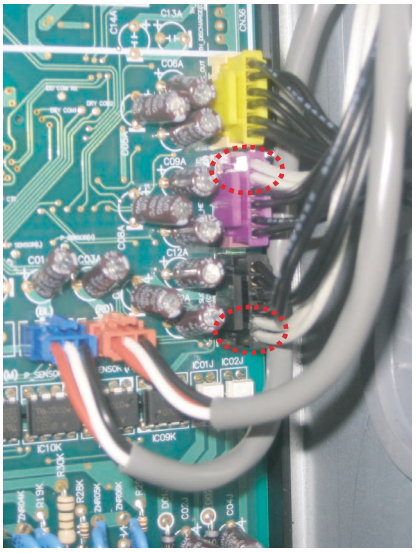
Error No.	Error type	Error point	Main reasons
41* (Inverter) Master 411 Slave1 412 Slave2 413 47* (Constant) Master 471 Slave1 472 Slave2 473	Compressor discharge pipe temperature sensor error	Sensor measurement valve is abnormal (Open/Short)	1. Defective connection of the compressor discharge pipe temperature sensor 2. Defective discharge pipe compressor sensor of the compressor (open/short) 3. Defective outdoor PCB

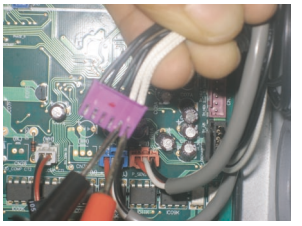
■ Error diagnosis and countermeasure flow chart



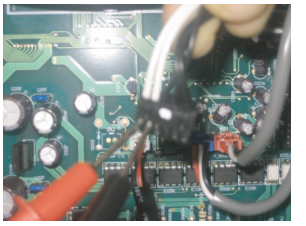
Note1) Error is generated if the resistance is more than 5MΩ(open) and less than 2kΩ (short)

Note: Standard values of resistance of sensors at different temperatures (±5% variation)
10°C = 362kΩ : 25°C= 200kΩ : 50°C= 82kΩ : 100°C= 18.5kΩ





Check the resistance inverter compressor discharge temperature sensor



Check the resistance of constant compressor discharge temperature sensor

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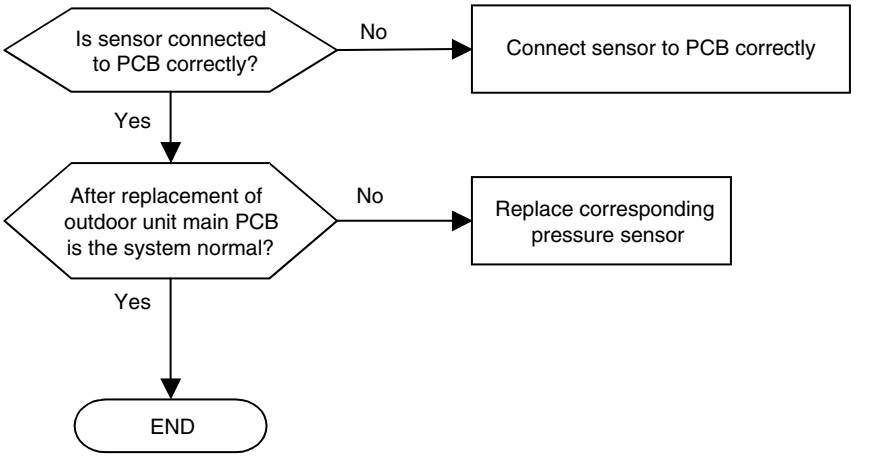
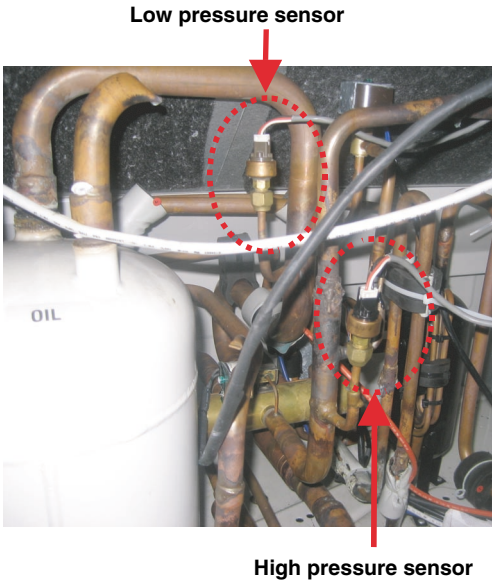
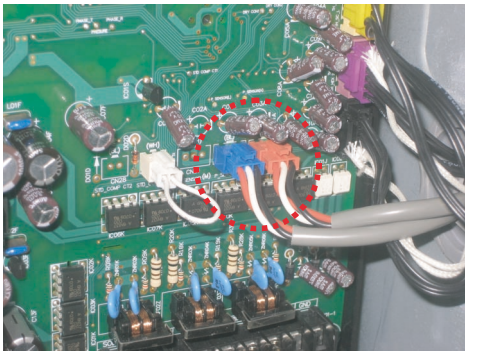
Error No.	Error type	Error point	Main reasons
42* Master 421 Slave1 422 Slave2 423	Sensor error of low pressure	Abnormal value of sensor (Open/Short)	1. Bad connection of low pressure connector 2. Defect of low pressure connector (Open/Short) 3. Defect of outdoor PCB
43* Master 431 Slave1 432 Slave2 433	Sensor error of high pressure	Abnormal value of sensor (Open/Short)	1. Bad connection of high pressure connector 2. Defect of high pressure connector (Open/Short) 3. Defect of outdoor PCB

■ Error diagnosis and countermeasure flow chart







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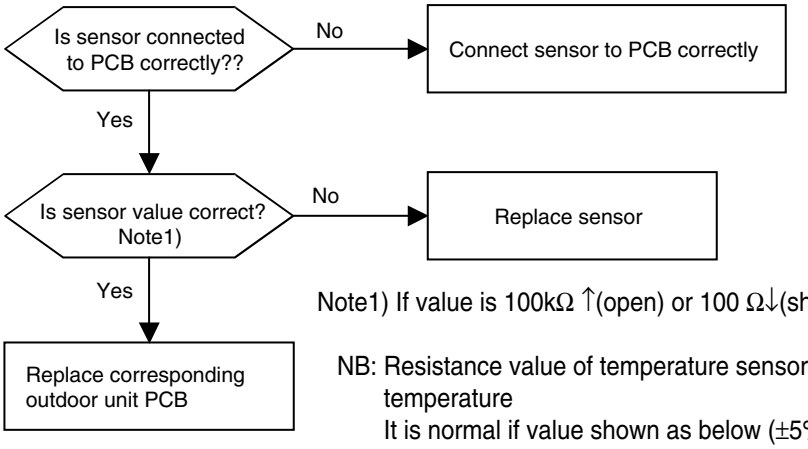
Error No.	Error type	Error point	Main reasons
44* Master 441 Slave1 442 Slave2 443	Sensor error of outdoor air temperature	Abnormal value of sensor (Open/Short)	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of outdoor PCB
45* Master 451 Slave1 452 Slave2 453 48* Master 481 Slave1 482 Slave2 483	Piping temperature sensor error of heat exchanger in master & slave outdoor unit heat exchanger (A,B)	Abnormal value of sensor (Open/Short)	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of outdoor PCB
46* Master 461 Slave1 462 Slave2 463	Compressor suction temperature sensor error	Abnormal value of sensor (Open/Short)	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of outdoor PCB

■ Error diagnosis and countermeasure flow chart



Note1) If value is 100kΩ ↑(open) or 100 Ω↓(short), error occurs

NB: Resistance value of temperature sensor change according to temperature
It is normal if value shown as below (±5% error)
Sensor of air temperature: 10°C = 20.7kΩ : 25°C= 10kΩ : 50°C= 3.4kΩ
Sensor of piping temperature: 10°C = 10kΩ : 25°C= 5kΩ : 50°C= 1.8kΩ

Error No.	Error type	Error point	Main reasons
47* Master 471 Slave1 472 Slave2 473	Discharge piping temperature sensor error of constant compressor	Abnormal value of sensor (Open/Short)	Refer to CH41
48* Master 481 Slave1 482 Slave2 483	Piping temperature sensor error of heat Exchanger in master & slave outdoor unit heat exchanger (B)	Abnormal value of sensor (Open/Short)	Refer to CH45

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Error No.	Error type	Error point	Main reasons
50* Master 501 Slave1 502 Slave2 503	Outdoor unit3phase power omission error	Omitting one or more of R,S,T input power	1. Input voltage abnormal (R,S,T,N) 2. Check power Line connection condition 3. main PCB damage

Display			Title	Cause of error
5	0	1	Omitting connection of R power of outdoor unit = 50 error ❊ Note Omitting connection of S power of outdoor unit = 23 error Omitting connection of T power of outdoor unt = main PCB power off	Omitting connection of master outdoor unit
		2		Omitting connection of slave1 outdoor unit
		3		Omitting connection of slave2 outdoor unit
		4		Omitting connection of slave3 outdoor unit

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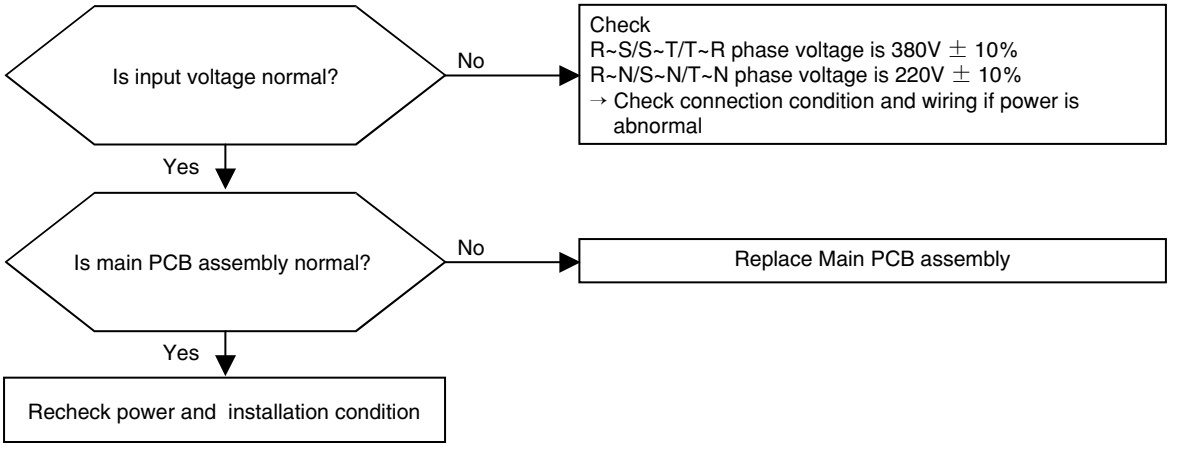
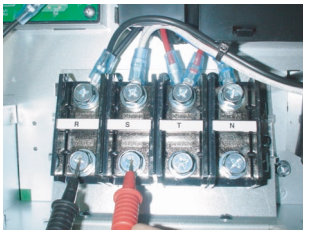
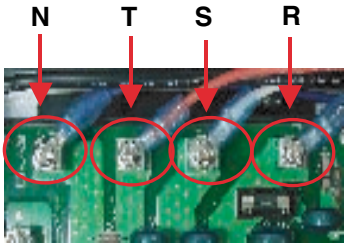
■ Error diagnosis and countermeasure flow chart

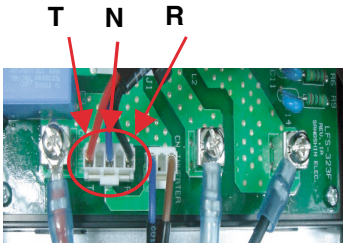


* Measuring input voltage

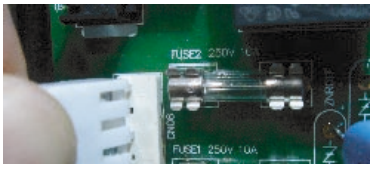


* Noise filter wiring





* Main PCB power connection



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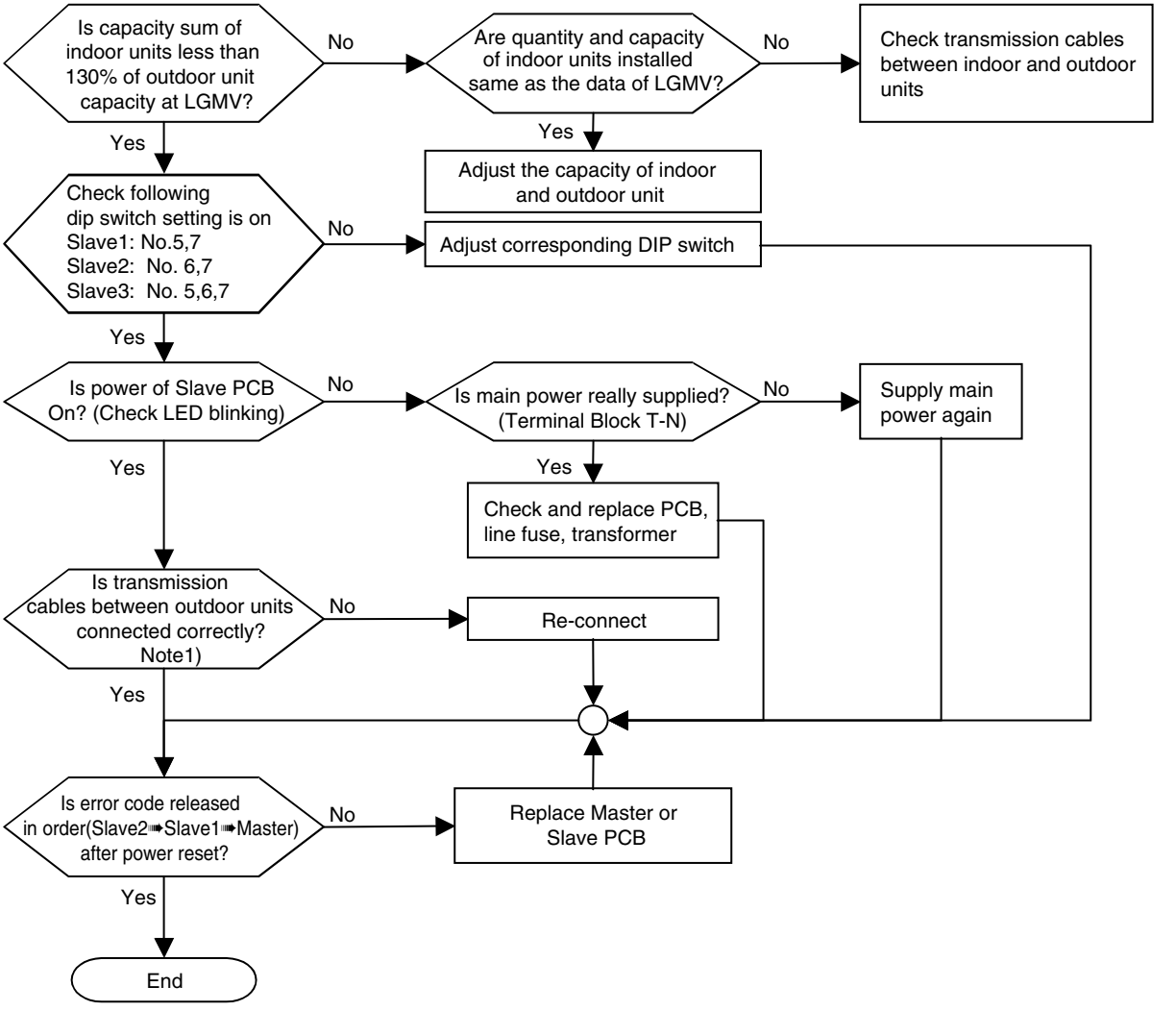
Error No.	Error type	Error point	Main reasons
51	Over-Capacity (Sum of indoor unit capacity is more than outdoor capacity)	Sum of indoor unit capacity exceed outdoor unit capacity specification	1. Sum of indoor units capacity is more than allowable max. connecting capacity. (Note 1) 2. Wrong connection of transmission cable/piping 3. Control error of slave outdoor unit dip switch 4. Power supply defect of slave unit PCB 5. Defect of outdoor unit PCB

■ Error diagnosis and countermeasure flow chart


Is capacity sum of indoor units less than 130% of outdoor unit capacity at LGMV?
No
Are quantity and capacity of indoor units installed same as the data of LGMV?
No
Check transmission cables between indoor and outdoor units
Yes
Yes
Adjust the capacity of indoor and outdoor unit
Check following dip switch setting is on
Slave1: No.5,7
Slave2: No. 6,7
Slave3: No. 5,6,7
No
Adjust corresponding DIP switch
Yes
Is power of Slave PCB On? (Check LED blinking)
No
Is main power really supplied? (Terminal Block T-N)
No
Supply main power again
Yes
Yes
Check and replace PCB, line fuse, transformer
Is transmission cables between outdoor units connected correctly? Note1)
No
Re-connect
Yes
Is error code released in order(Slave2➡Slave1➡Master) after power reset?
No
Replace Master or Slave PCB
Yes
End

Note1)

Ratio of the running indoor units to the outdoor: Within 10 ~ 100%
(A combination operation over 100% cause to reduce each indoor unit capacity.)

■ Combination Ration(50~200%)

Outdoor number	Connection capacity
Single outdoor units	200%
Double outdoor units	160%
Triple outdoor units	130%

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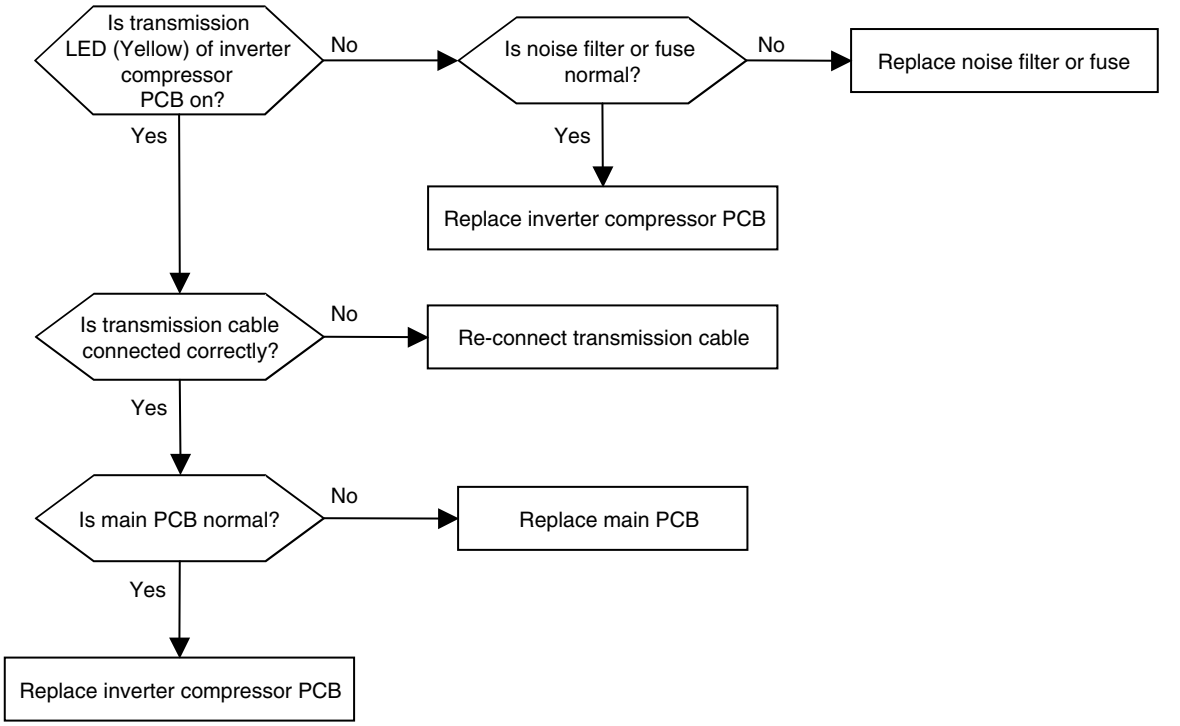
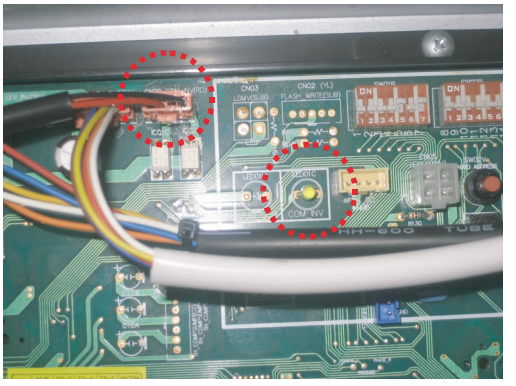
Error No.	Error type	Error point	Main reasons
52* Master 521 Slave1 522 Slave2 523	Transmission error between (Inverter PCB ➔ main PCB)	Main controller of master unit of master unit can't receive signal from inverter controller	1. Power cable or transmission cable is not connected 2. Defect of outdoor main fuse/noise filter 3. Defect of outdoor main / inverter PCB

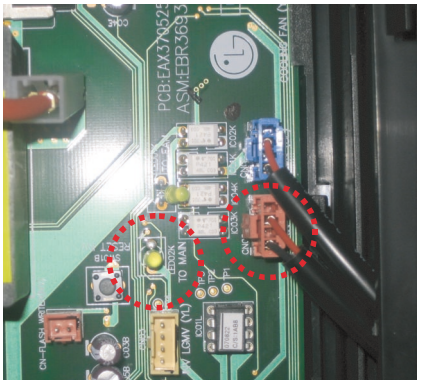
■ Error diagnosis and countermeasure flow chart



* The method of checking main PCB and inverter compressor PCB (If normal, transmission LED blinks)



Transmission connector & LED in main PCB



Transmission connector & LED in inverter compressor PCB

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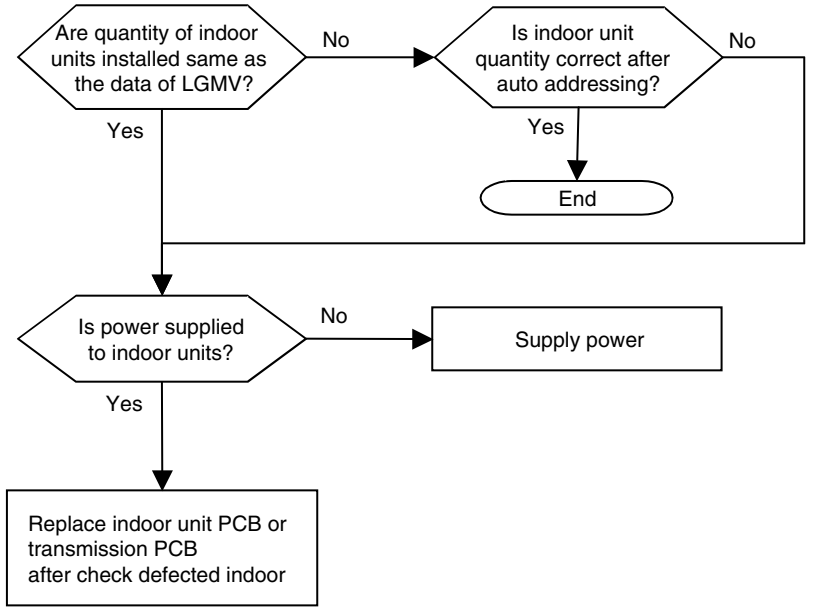
Error No.	Error type	Error point	Main reasons
53	Transmission error (Indoor unit ➔ main PCB)	In case main PCB can't receive signal from indoor unit	1. Transmission cables are not connected 2. Transmission cables are short / open 3. Defect of outdoor main / indoor PCB

■ Error diagnosis and countermeasure flow chart



In case of CH53, almost happened with CH05, the indoor units not operated actually are normal so check with same method of CH05. and additionally check as shown as below and above flow chart

- Although the quantity of indoor units installed is same as LGMV data there may be a few indoor units with which the number of transmission is not increased with LGMV
- Although the quantity of indoor units installed is not same as LGMV data, and if transmission of the indoor unit displayed at LGMV is done well then the indoor unit suspected to have some problem (and is not appear at LGMV) may have following problems
  ① wrong connection of transmission cable or power cable
  ② failure of power / PCB / transmission cable
  ③ duplication of indoor unit number
- If transmission is not doing well wholly then the auto addressing is not done
- The case that CH53 appear at indoor unit also auto addressing is not done so indoor unit address may be duplicated

* After replacement of indoor unit PCB, auto addressing should be done, if central controller is installed then the central control address also should be input.
In case that only transmission PCB is replaced above process is not needed

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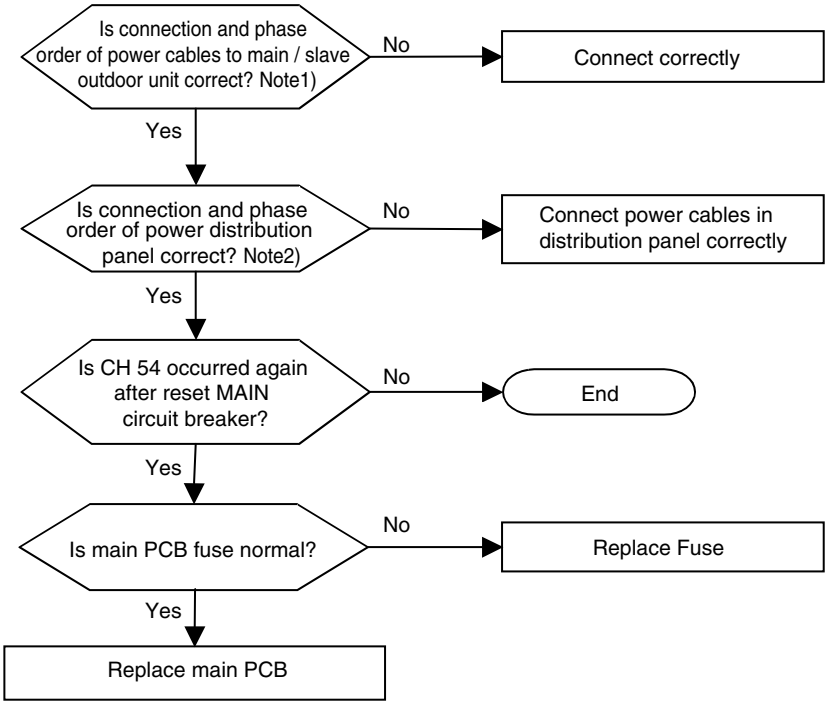
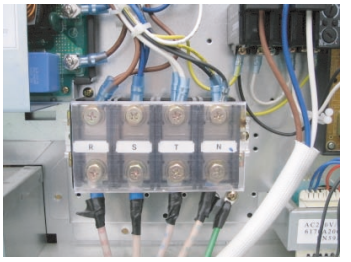
Error No.	Error type	Error point	Main reasons
54* Master 541 Slave1 542 Slave2 543	Wrong connection of 3Ø power supply cable (Reverse direction / missing a phase)	Wrong connection of 3Ø power supply cable (Reverse direction / missing a phase)	1. main PCB defect 2. No power of R,S,T supplied 3. Wring connection of R,S,T cables 4. main PCB Fuse failure

■ Error diagnosis and countermeasure flow chart



Note1) Check power cable connection state, phase (R-S-T) order, power supply state in control box of product



Note2) Check power cable connection state, phase order, power supply state in distribution panel

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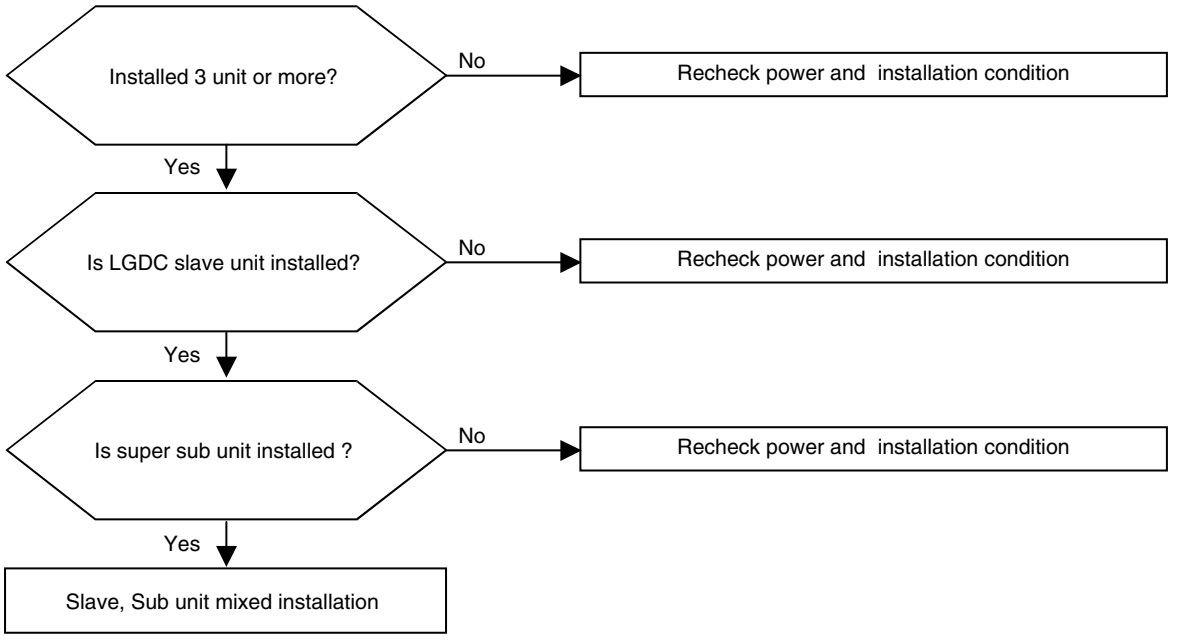
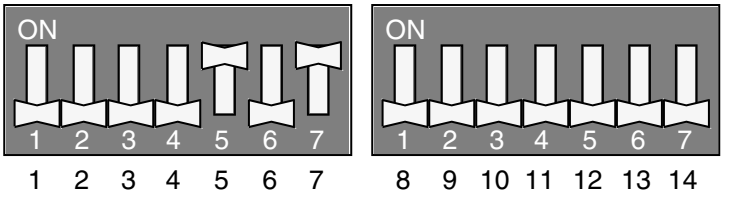
Error No.	Error type	Error point	Main reasons
59	Slave outdoor unit mixed installation	Installing old Sub outdoor unit and new slave outdoor unit together	Installing LGDC slave unit and super sub unit together

■ Error diagnosis and countermeasure flow chart

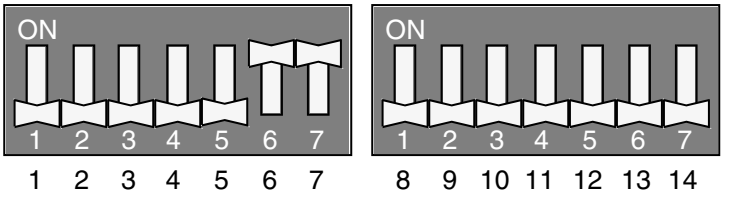


✻ Slave unit dip switch setting

Slave 1



Slave 2



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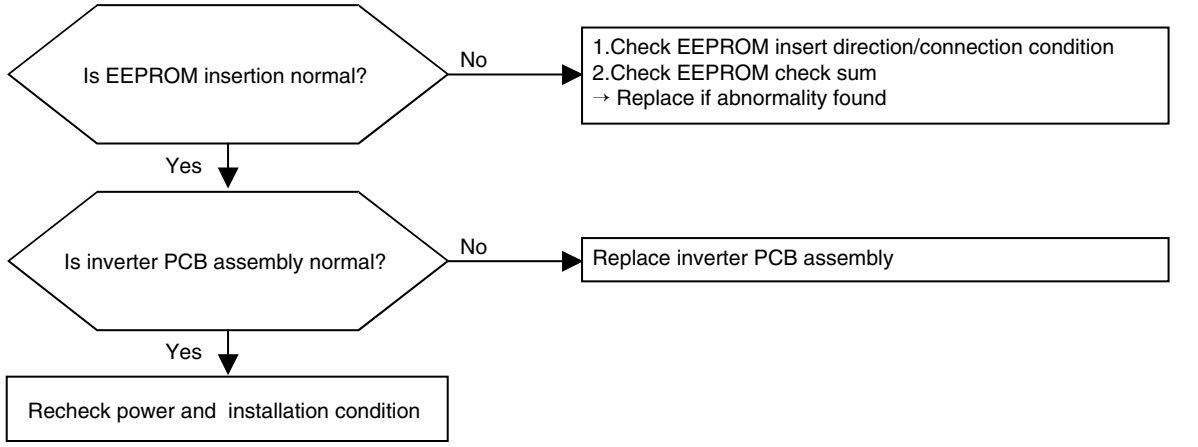
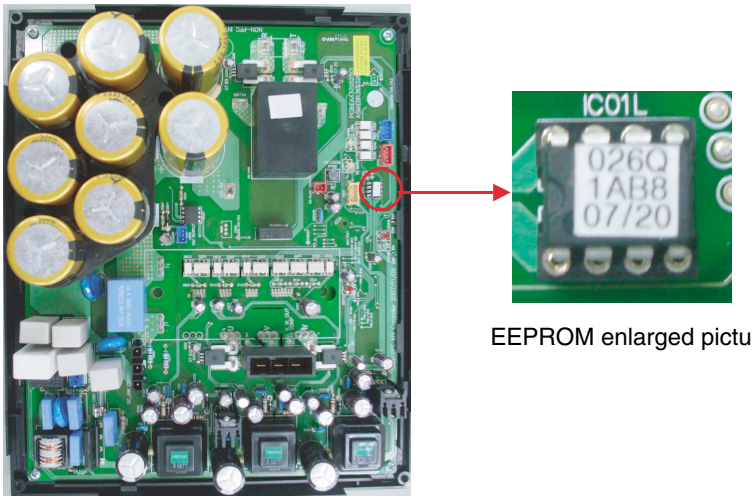
Error No.	Error type	Error point	Main reasons
60* Master 601 Slave1 602 Slave2 603	Inverter PCB EEPROM error	EEPROM Access error and check sum error	1. EEPROM contact defect/wrong insertion 2. Different EEPROM Version 3. Outdoor unit inverter PCB assembly damage

■ Error diagnosis and countermeasure flow chart

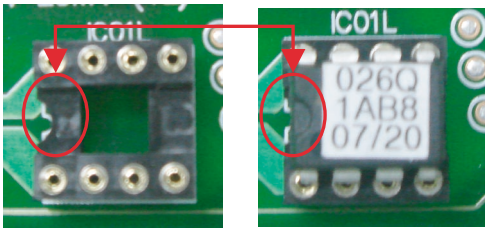


* Inverter EEPROM inserting point



EEPROM enlarged picture

* Right inserting direction of inverter EEPROM



※ Note : Replace after power off

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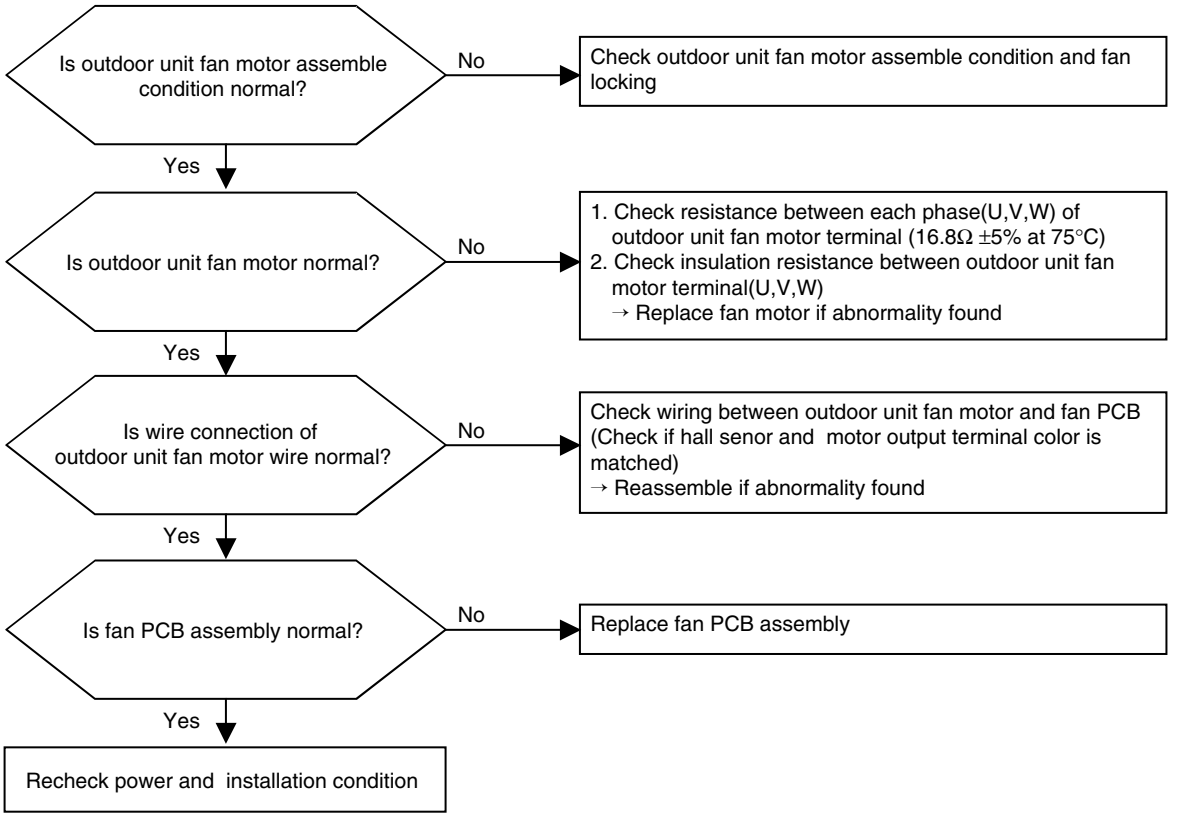
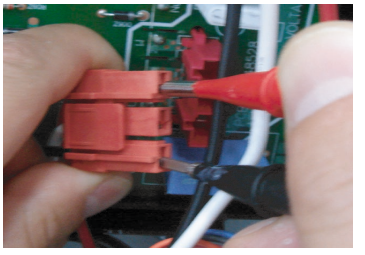
Error No.	Error type	Error point	Main reasons
67* Master 671 Slave1 672 Slave2 673	Fan lock error	Fan RPM is 10RPM or less for 5 sec. when outdoor unit fan starts or 40 RPM or less after fan starting.	1. Fan motor defect / assembly condition abnormal 2. Wrong connection of fan motor connector (Hall sensor, U,V,W output) 3. Reversing rotation after RPM target apply 4. Fan PCB assembly defect

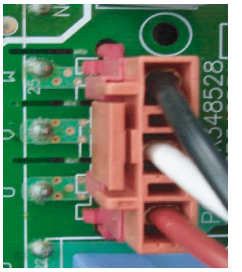
■ Error diagnosis and countermeasure flow chart


Is outdoor unit fan motor assemble condition normal?
No
Check outdoor unit fan motor assemble condition and fan locking
Yes
Is outdoor unit fan motor normal?
No
1. Check resistance between each phase(U,V,W) of outdoor unit fan motor terminal (16.8Ω ±5% at 75°C)
2. Check insulation resistance between outdoor unit fan motor terminal(U,V,W)
→ Replace fan motor if abnormality found
Yes
Is wire connection of outdoor unit fan motor wire normal?
No
Check wiring between outdoor unit fan motor and fan PCB (Check if hall senor and motor output terminal color is matched)
→ Reassemble if abnormality found
Yes
Is fan PCB assembly normal?
No
Replace fan PCB assembly
Yes
Recheck power and installation condition

* Fan motor resistance measuring between each phase



* Fan motor wire connection



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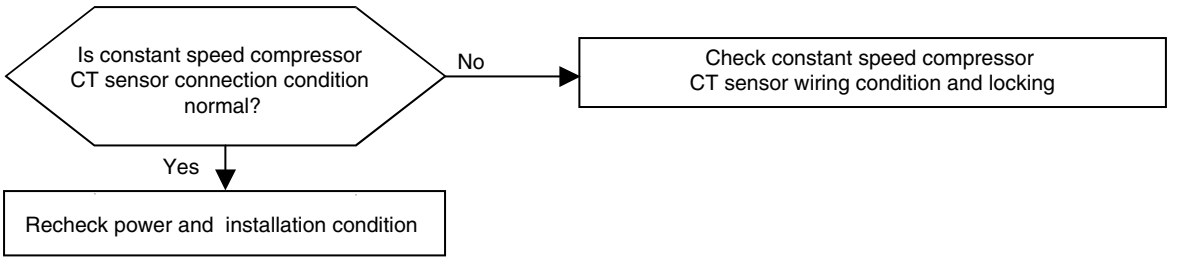
Error No.	Error type	Error point	Main reasons
70* Master 701 Slave1 702 Slave2 703	Constant speed compressor CT sensor error	Constant speed compressor CT sensor open/short	1. Constant speed compressor CT sensor defect

■ Error diagnosis and countermeasure flow chart


Is constant speed compressor CT sensor connection condition normal?
No
Check constant speed compressor CT sensor wiring condition and locking
Yes
Recheck power and installation condition

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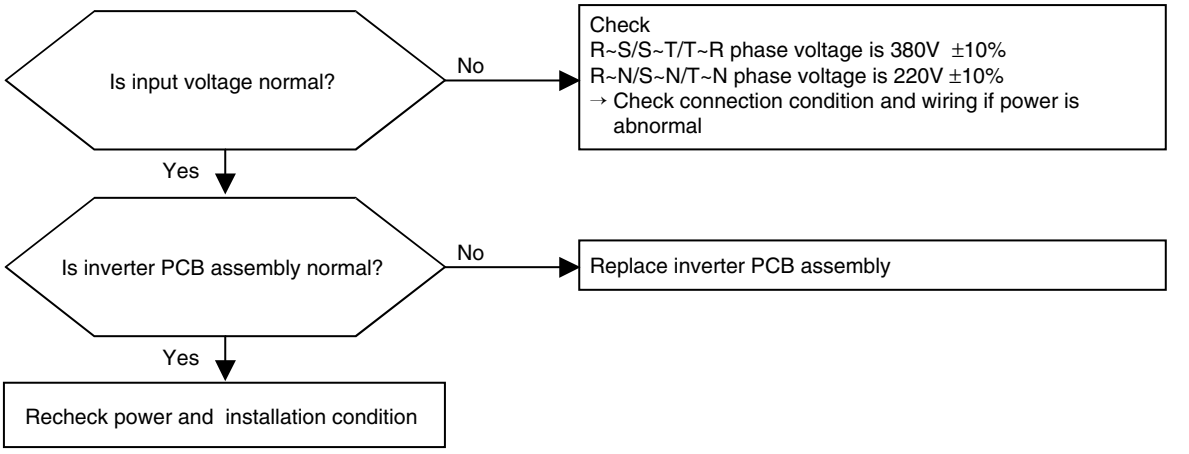
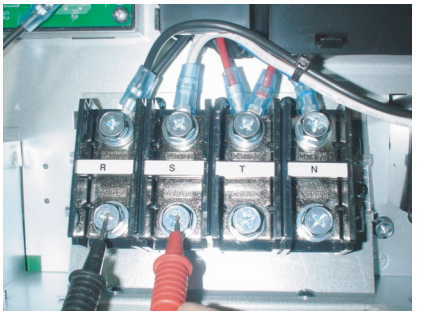
Error No.	Error type	Error point	Main reasons
71* Master 711 Slave1 712 Slave2 713	Inverter input current CT sensor error	Micom input voltage isn't within 2.5V ±0.3V at initial state of power supply	1. Input voltage abnormal (T-N) 2. Outdoor unitinverter PCB damage (CT sensing part)

■ Error diagnosis and countermeasure flow chart



* Measuring input voltage



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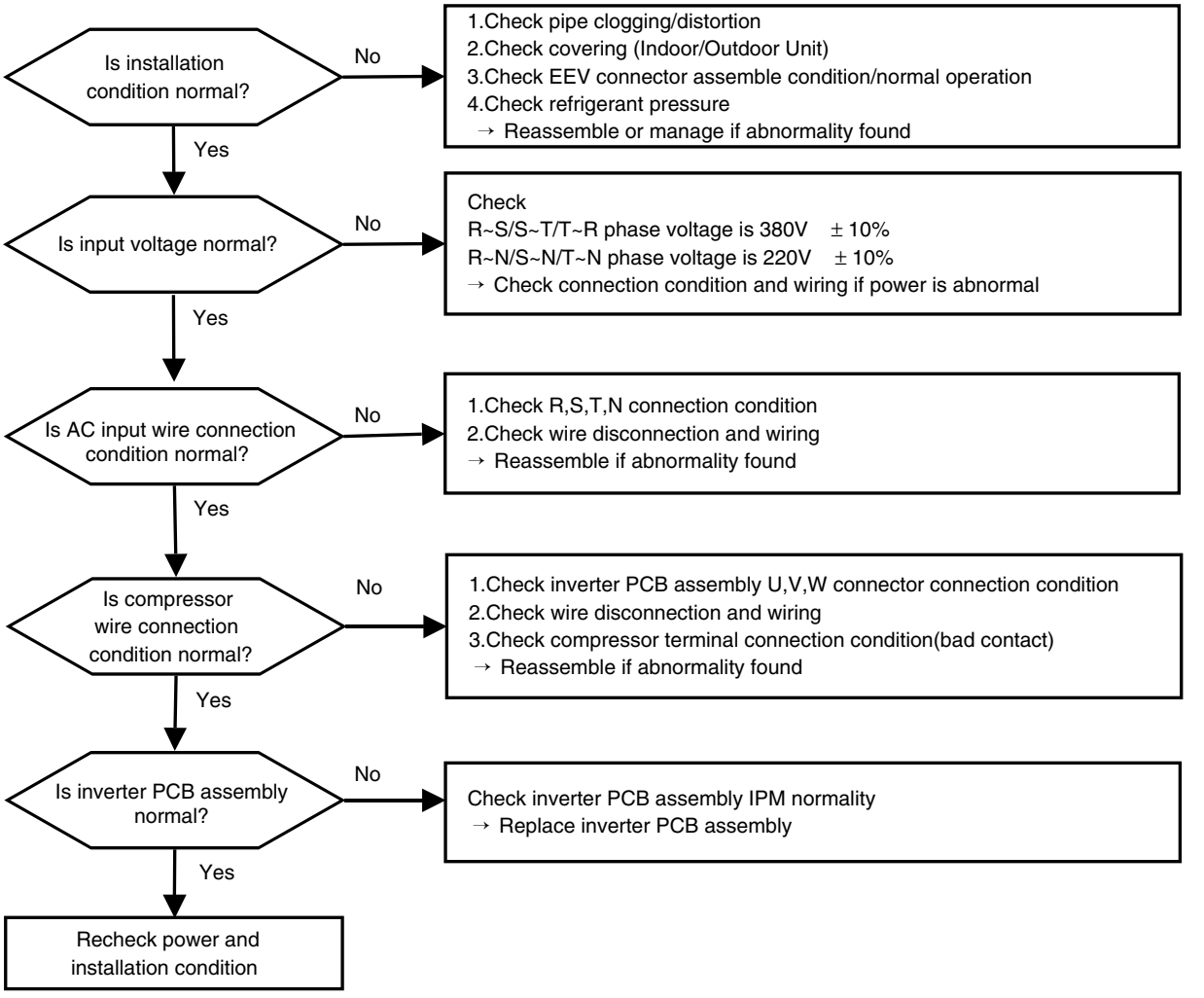
Error No.	Error type	Error point	Main reasons
73* Master 731 Slave1 732 Slave2 733	AC input instant over current error (Matter of software)	Inverter PCB input 3 phase power current is over 50A(peak) for 2ms	1.Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge) 2.Compressor damage(Insulation damage/Motor damage) 3.Input voltage abnormal(R,S,T,N) 4.Power line assemble condition abnormal 5.Inverter PCB assembly damage(input current sensing part)

■ Error diagnosis and countermeasure flow chart


Is installation condition normal?
No
1.Check pipe clogging/distortion
2.Check covering (Indoor/Outdoor Unit)
3.Check EEV connector assemble condition/normal operation
4.Check refrigerant pressure
→ Reassemble or manage if abnormality found
Yes
Is input voltage normal?
No
Check
R~S/S~T/T~R phase voltage is 380V ±10%
R~N/S~N/T~N phase voltage is 220V ±10%
→ Check connection condition and wiring if power is abnormal
Yes
Is AC input wire connection condition normal?
No
1.Check R,S,T,N connection condition
2.Check wire disconnection and wiring
→ Reassemble if abnormality found
Yes
Is compressor wire connection condition normal?
No
1.Check inverter PCB assembly U,V,W connector connection condition
2.Check wire disconnection and wiring
3.Check compressor terminal connection condition(bad contact)
→ Reassemble if abnormality found
Yes
Is inverter PCB assembly normal?
No
Check inverter PCB assembly IPM normality
→ Replace inverter PCB assembly
Yes
Recheck power and installation condition

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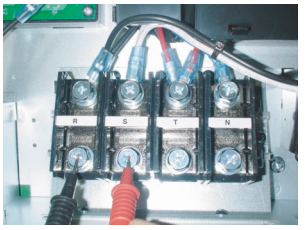
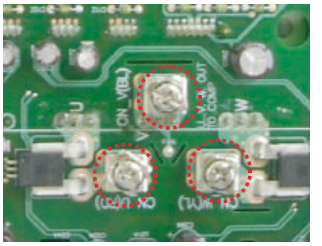
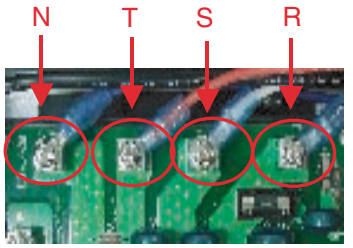
Measuring input voltage



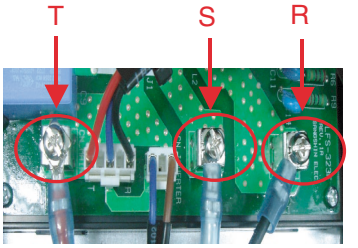
Compressor wire connection



Noise filter wiring

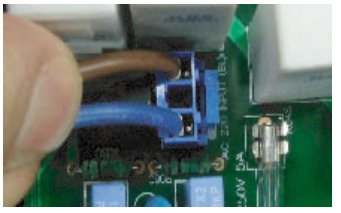


Noise filter input (upper part)



Noise filter output(lower part)

Inverter PCB assembly/Wiring power to inverter PCB on noise filter



Inverter PCB assembly power connection

Noise filter power connection

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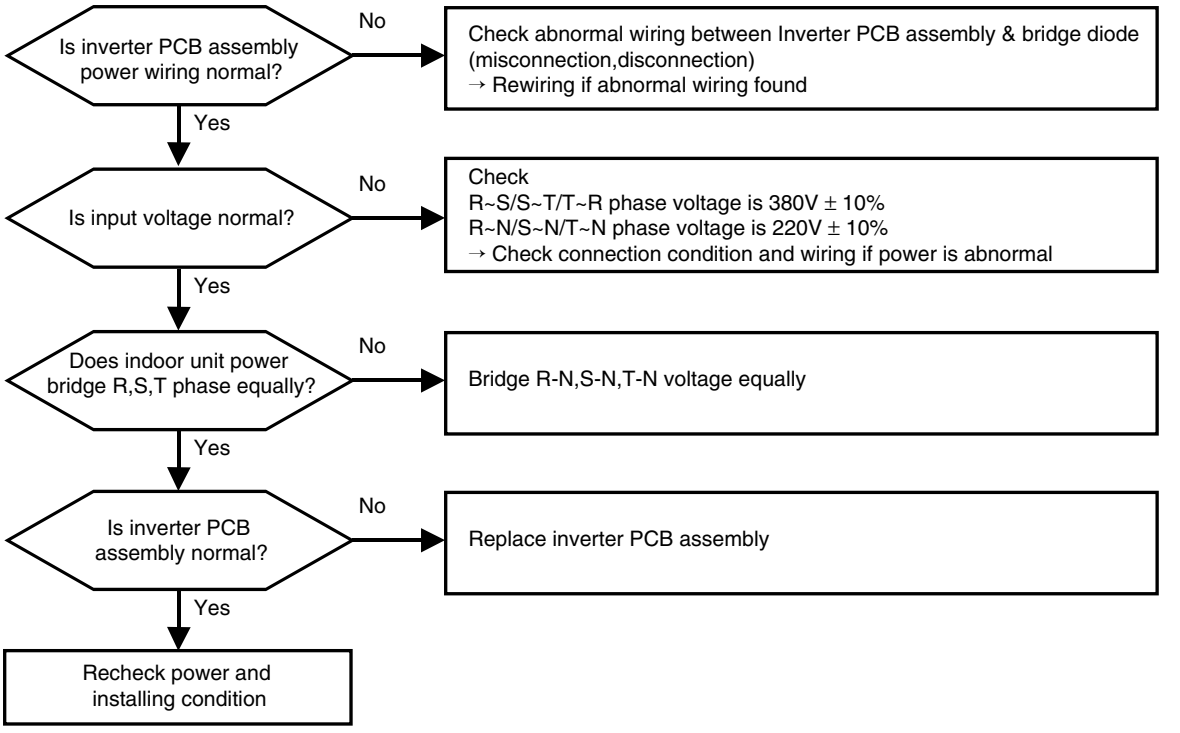
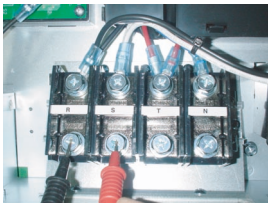
Error No.	Error type	Error point	Main reasons
74* Master 741 Slave1 742 Slave2 743	3 Phase power unbalance	During operation(compressor frequency is over 50Hz), difference between R & T phase is 5A for 10 seconds.	1. CT sensor defect 2. Capacity over of AVR 3. Bridge R-N or S-N or T-N phase voltage unequally at indoor unit etc.

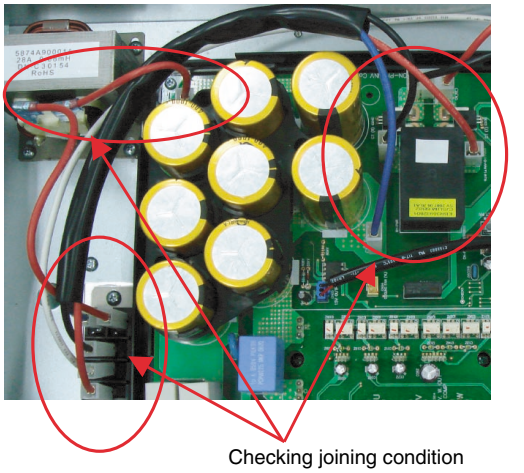
■ Error diagnosis and countermeasure flow chart

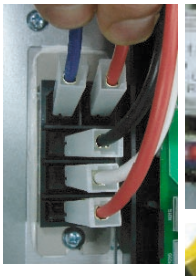

Is inverter PCB assembly power wiring normal?
No
Check abnormal wiring between Inverter PCB assembly & bridge diode (misconnection,disconnection)
→ Rewiring if abnormal wiring found
Yes
Is input voltage normal?
No
Check
R~S/S~T/T~R phase voltage is 380V ± 10%
R~N/S~N/T~N phase voltage is 220V ± 10%
→ Check connection condition and wiring if power is abnormal
Yes
Does indoor unit power bridge R,S,T phase equally?
No
Bridge R-N,S-N,T-N voltage equally
Yes
Is inverter PCB assembly normal?
No
Replace inverter PCB assembly
Yes
Recheck power and installing condition

Measuring input voltage



Inverter PCB & Bridge diode wiring





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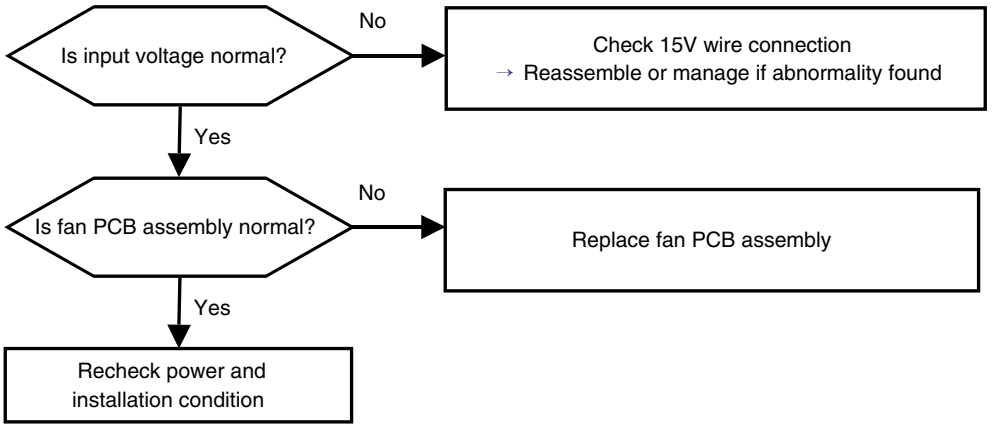
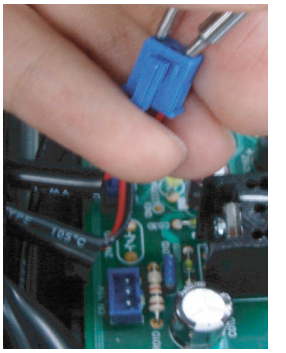
Error No.	Error type	Error point	Main reasons
75* Master 751 Slave1 752 Slave2 753	Fan CT sensor error	Offset of micom which senses the fan motor phase current is not 2.5V	1.Input voltage is abnormal(not 15V) 2.Fan PCB assembly defect

■ Error diagnosis and countermeasure flow chart



Checking 15V



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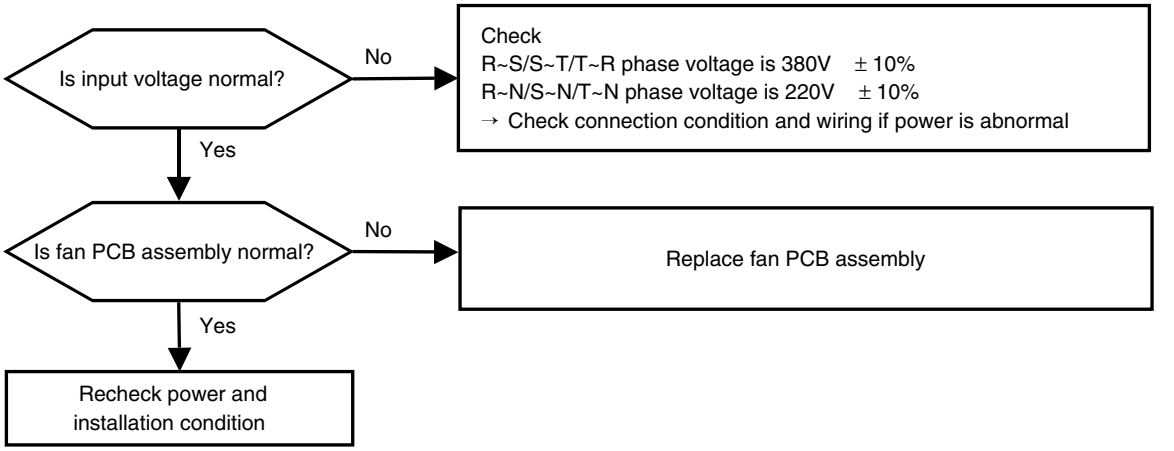
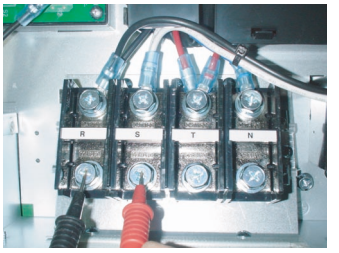
Error No.	Error type	Error point	Main reasons
76* Master 761 Slave1 762 Slave2 763	Fan DC link high voltage error	Fan PCB DC link voltage supplied over 780V\	1.Input power abnormal 2.Fan PCB assembly defect

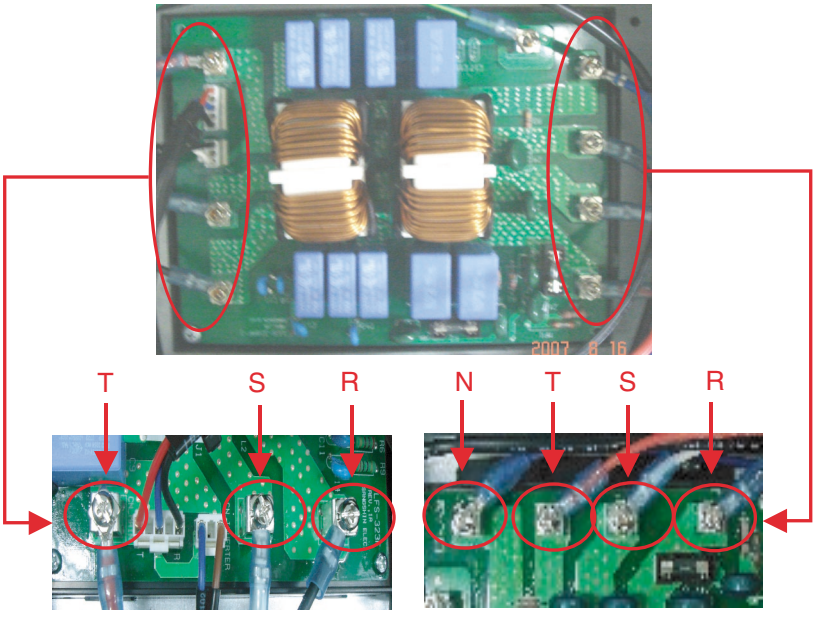
■ Error diagnosis and countermeasure flow chart



Measuring input voltage



Noise filter wiring



Noise filter output(lower part)

Noise filter input (upper part)

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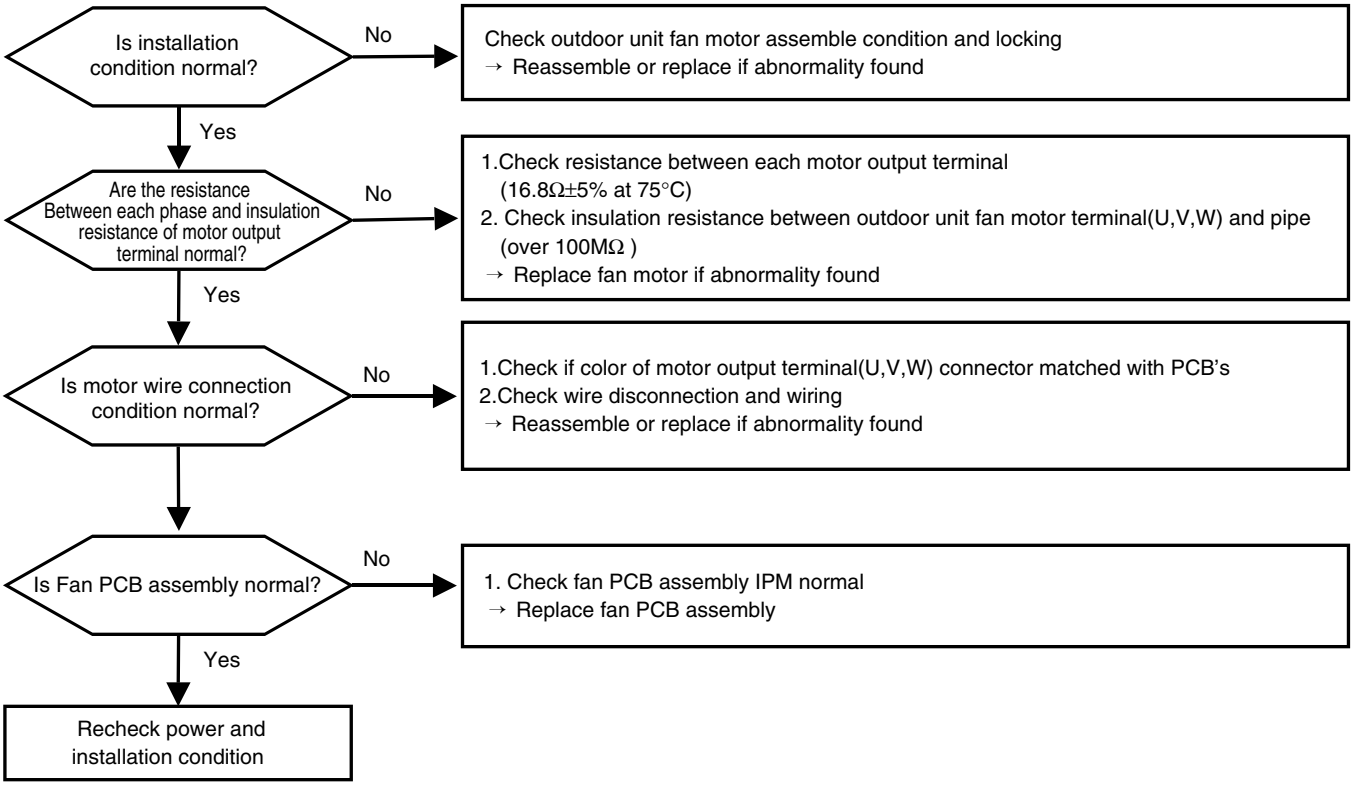
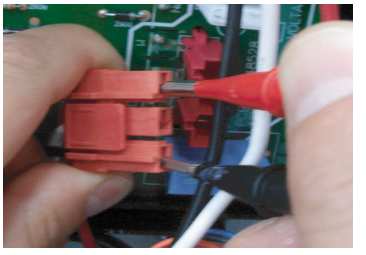
Error No.	Error type	Error point	Main reasons
77* Master 771 Slave1 772 Slave2 773	Fan over current error	Output current is over 5A for 40ms	1.Overload operation 2.Fan motor defect 3.Fan PCB assembly defect

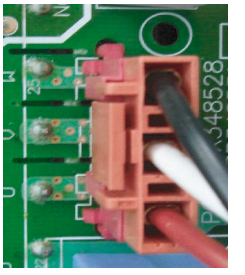
■ Error diagnosis and countermeasure flow chart


Is installation condition normal?
No
Check outdoor unit fan motor assemble condition and locking
→ Reassemble or replace if abnormality found
Yes
Are the resistance Between each phase and insulation resistance of motor output terminal normal?
No
1.Check resistance between each motor output terminal (16.8Ω±5% at 75°C)
2. Check insulation resistance between outdoor unit fan motor terminal(U,V,W) and pipe (over 100MΩ)
→ Replace fan motor if abnormality found
Yes
Is motor wire connection condition normal?
No
1.Check if color of motor output terminal(U,V,W) connector matched with PCB's
2.Check wire disconnection and wiring
→ Reassemble or replace if abnormality found
Is Fan PCB assembly normal?
No
1. Check fan PCB assembly IPM normal
→ Replace fan PCB assembly
Yes
Recheck power and installation condition

Measuring fan motor phase resistance



Fan motor wire connection



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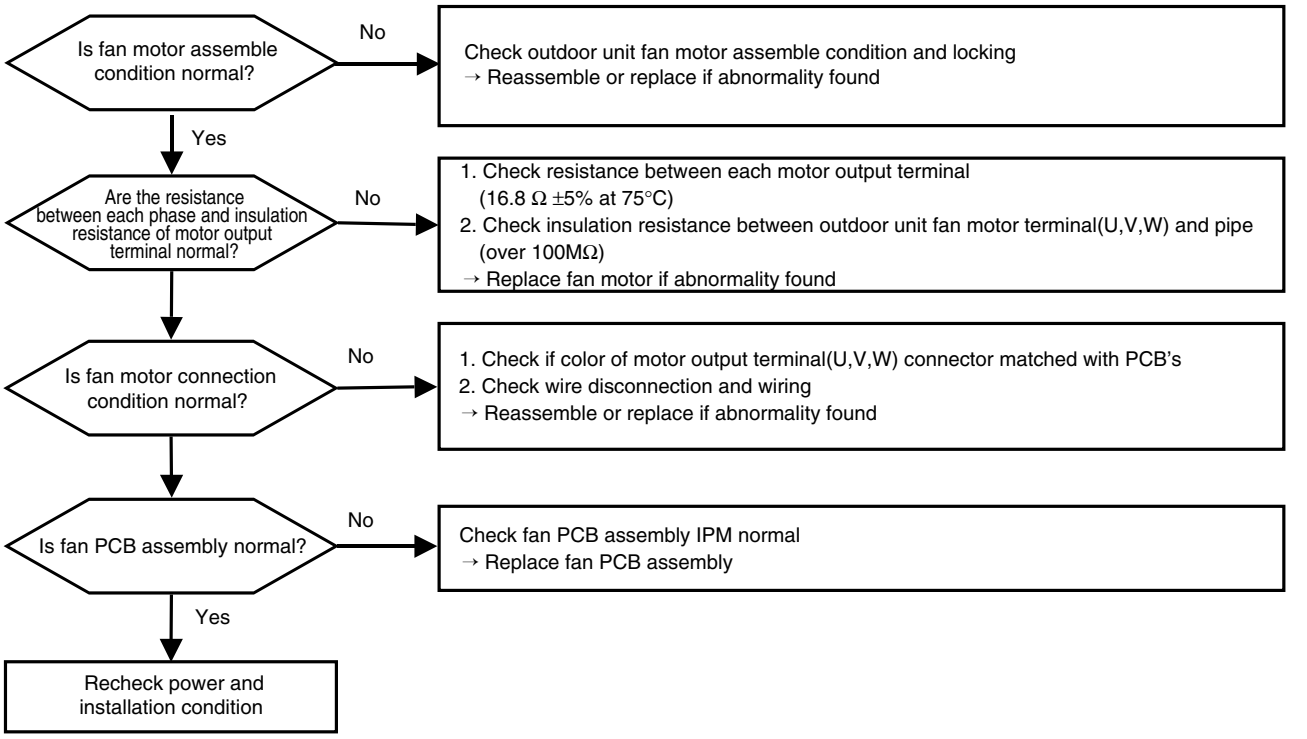
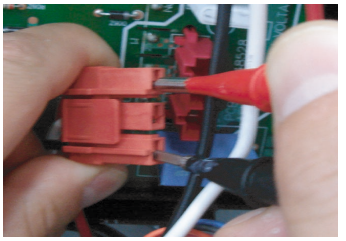
Error No.	Error type	Error point	Main reasons
79* Master 791 Slave1 792 Slave2 793	Fan starting failure error	Fan motor initial starting failure	1.Fan motor defect/ assemble condition abnormal 2.Fan PCB defect

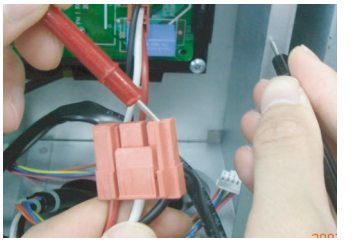
■ Error diagnosis and countermeasure flow chart


Is fan motor assemble condition normal?
No
Check outdoor unit fan motor assemble condition and locking
→ Reassemble or replace if abnormality found
Yes
Are the resistance between each phase and insulation resistance of motor output terminal normal?
No
1. Check resistance between each motor output terminal (16.8 Ω ±5% at 75°C)
2. Check insulation resistance between outdoor unit fan motor terminal(U,V,W) and pipe (over 100MΩ)
→ Replace fan motor if abnormality found
Is fan motor connection condition normal?
No
1. Check if color of motor output terminal(U,V,W) connector matched with PCB's
2. Check wire disconnection and wiring
→ Reassemble or replace if abnormality found
Is fan PCB assembly normal?
No
Check fan PCB assembly IPM normal
→ Replace fan PCB assembly
Yes
Recheck power and installation condition

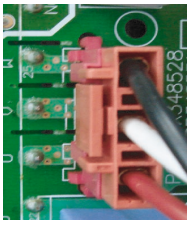
Measuring fan motor phase resistance



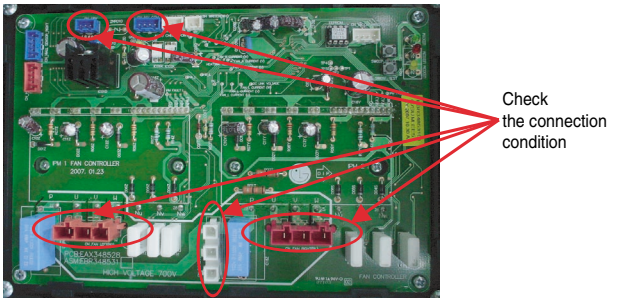
Measuring insulation resistance between fan terminal & chassis



Fan motor wire connection



Fan wire wiring



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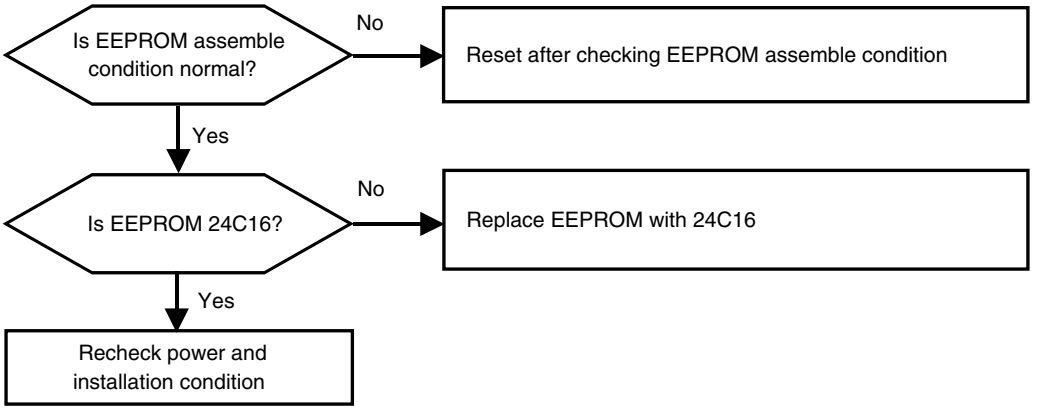
Error No.	Error type	Error point	Main reasons
86* Master 861 Slave1 862 Slave2 863	Main PCB EEPROM error	EEPROM access error	1. No EEPROM 2. EEPROM wrong insertion

■ Error diagnosis and countermeasure flow chart



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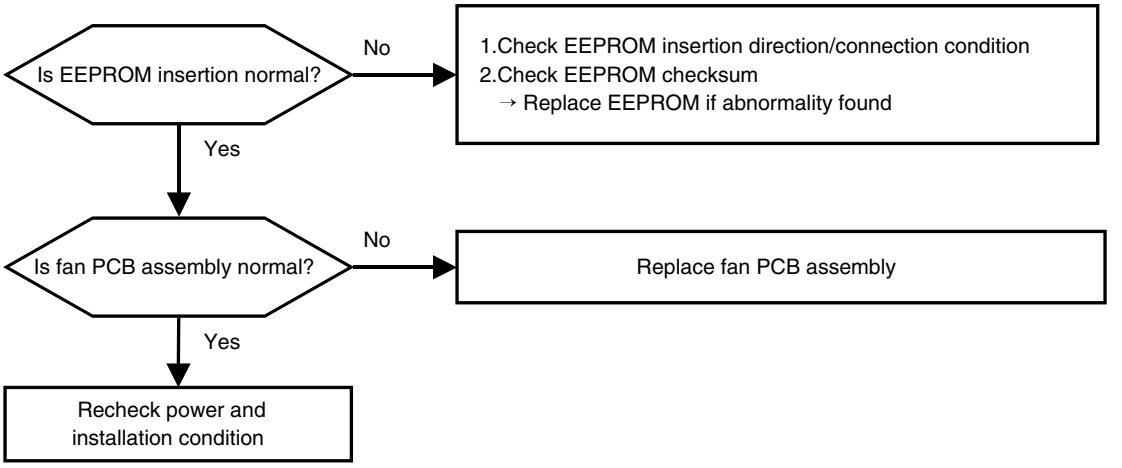
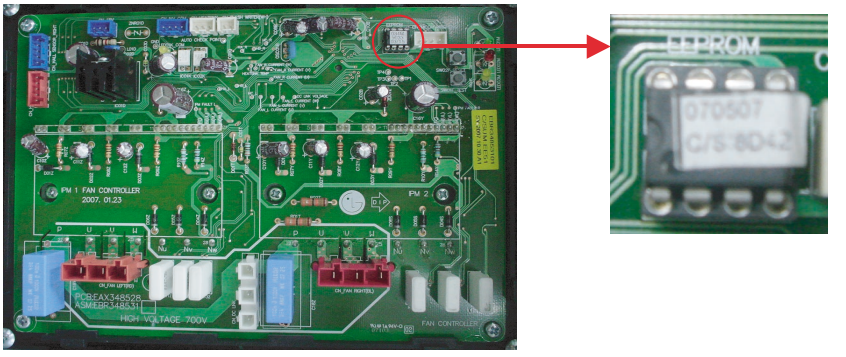
Error No.	Error type	Error point	Main reasons
87* Master 871 Slave1 872 Slave2 873	Fan PCB EEPROM error	Error occurs when checking the EEPROM checksum as initializing after power is supplied	1.EEPROM bad contact/wrong insertion 2.EEPROM Version is different 3.Outdoor unitfan PCB assembly damage

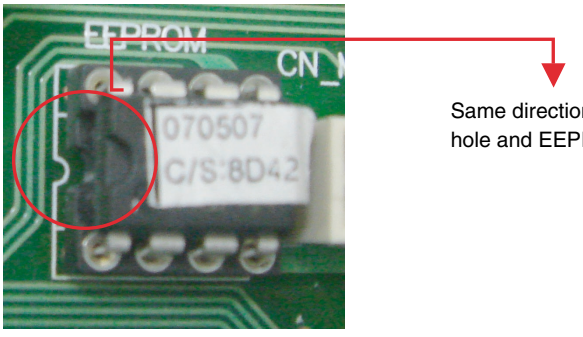
■ Error diagnosis and countermeasure flow chart



Fan EEPROM insertion



Inverter EEPROM insertion direction



Same direction both socket hole and EEPROM hole

❉ Note : Replace after power off

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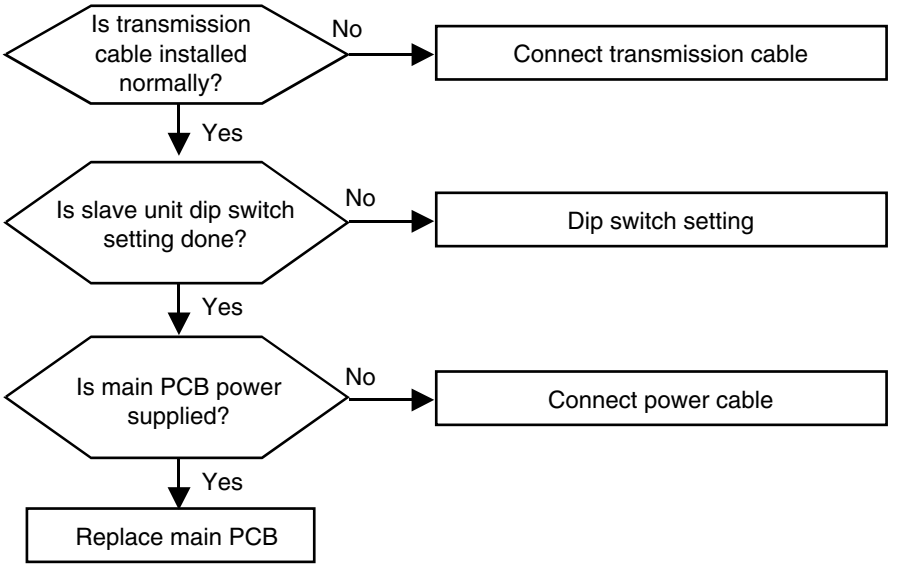
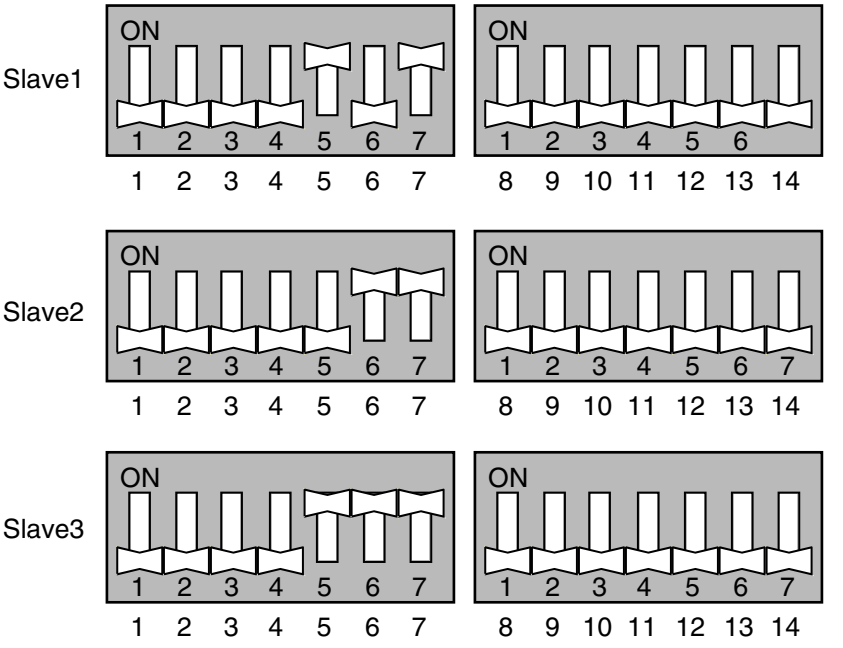
Error No.	Error type	Error point	Main reasons
104* Master 11 → 041 Slave1 12 → 042 Slave2 13 → 043	Transmission error between outdoors	Master displays outdoor unit number which is not communicated. Slave displays own error number	1.Loose connection of power cable/transmission cable¿¸(Open/Short) 2.Defect of each outdoor unit PCB

■ Error diagnosis and countermeasure flow chart



* Slave unit dip switch



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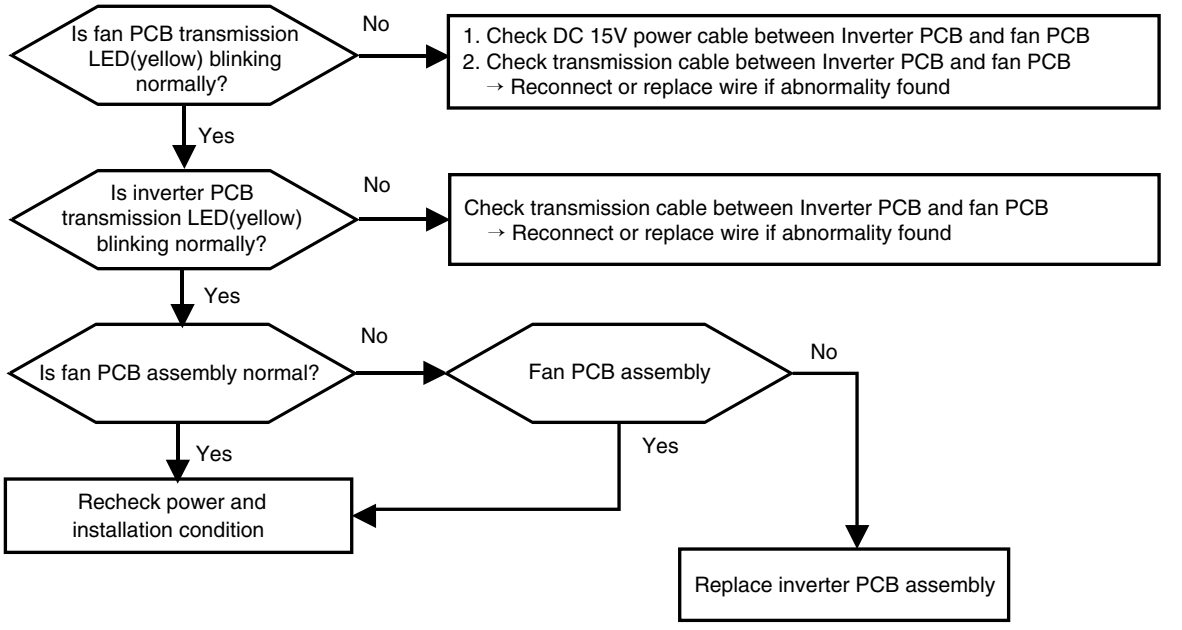
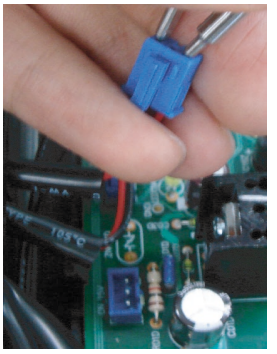
Error No.	Error type	Error point	Main reasons
105* Master 11 → 051 Slave1 12 → 052 Slave2 13 → 053	Transmission error (Fan PCB ↔ Inverter PCB)	Fan controller didn't receive signal from inverter controller	1. Wrong connection between Inverter and fan PCB 2. Fan PCB power not supplied 3. Outdoor unit inverter fan PCB defect

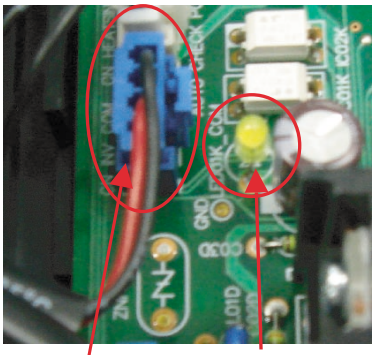
■ Error diagnosis and countermeasure flow chart


Is fan PCB transmission LED(yellow) blinking normally?
No
1. Check DC 15V power cable between Inverter PCB and fan PCB
2. Check transmission cable between Inverter PCB and fan PCB
→ Reconnect or replace wire if abnormality found
Yes
Is inverter PCB transmission LED(yellow) blinking normally?
No
Check transmission cable between Inverter PCB and fan PCB
→ Reconnect or replace wire if abnormality found
Yes
Is fan PCB assembly normal?
No
Fan PCB assembly
No
Yes
Yes
Recheck power and installation condition
Replace inverter PCB assembly

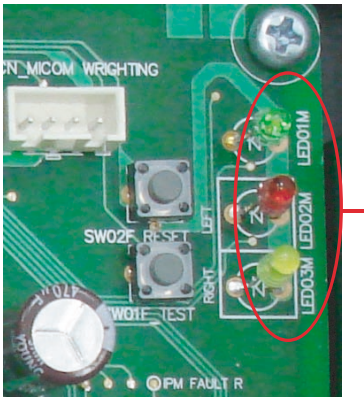
Checking 15V input



Fan transmission connection



Fan error LED



※ Note : Check fan PCB assembly error LED blinking (Check 108π¯ Error)

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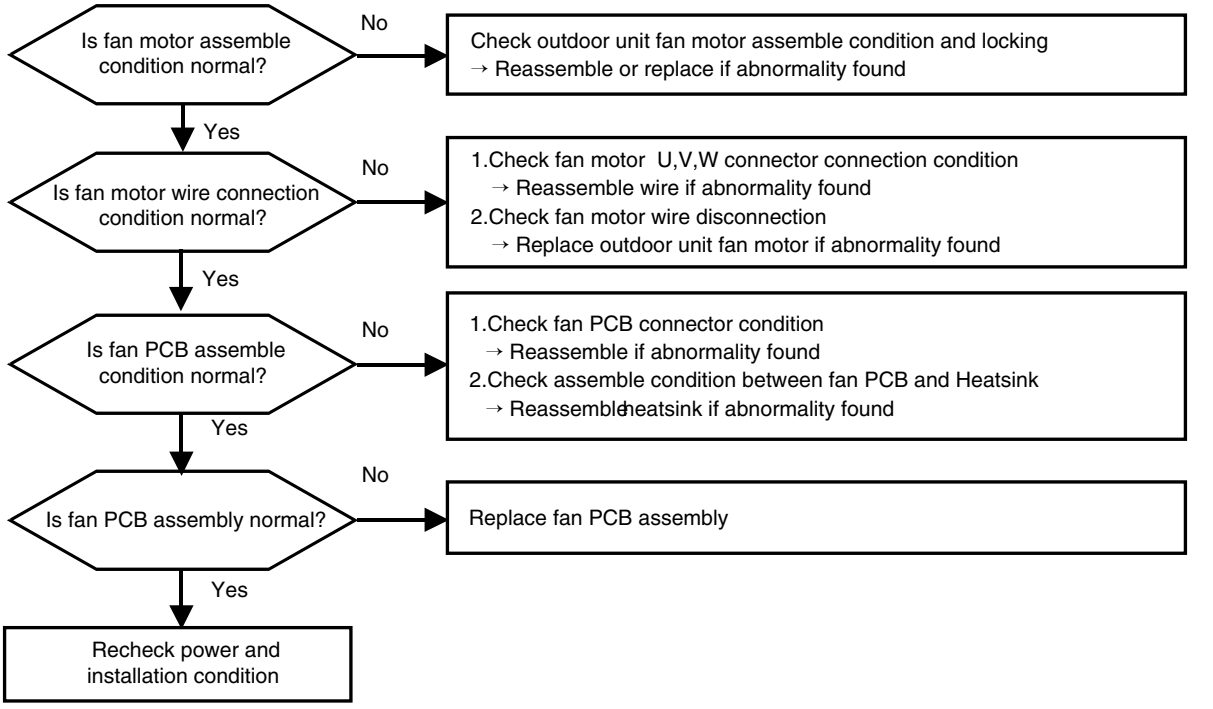
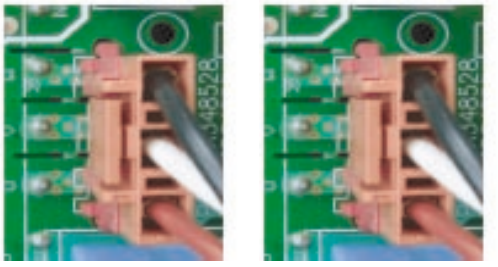
Error No.	Error type	Error point	Main reasons
106* Master 11 → 061 Slave1 12 → 062 Slave2 13 → 063	Outdoor unit fan PCB IPM failure	IPM protection circuit activation (over current / overheating)	1. Overload operation (Pipe clogging/Covering/EEV defect/Ref. overcharge 2. Outdoor unit fan motor assemble condition abnormal (Coil disconnection/Short/Insulation damage) 3. Fan PCB heatsink assemble condition abnormal 4. Fan PCB assembly defect

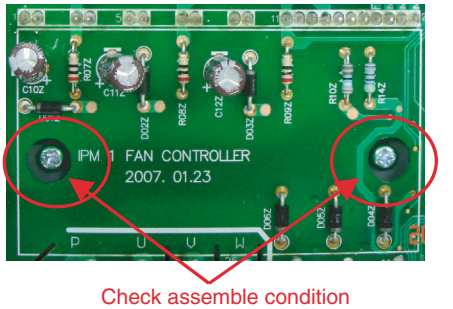
■ Error diagnosis and countermeasure flow chart


Is fan motor assemble condition normal?
No
Check outdoor unit fan motor assemble condition and locking
→ Reassemble or replace if abnormality found
Yes
Is fan motor wire connection condition normal?
No
1.Check fan motor U,V,W connector connection condition
→ Reassemble wire if abnormality found
2.Check fan motor wire disconnection
→ Replace outdoor unit fan motor if abnormality found
Yes
Is fan PCB assemble condition normal?
No
1.Check fan PCB connector condition
→ Reassemble if abnormality found
2.Check assemble condition between fan PCB and Heatsink
→ Reassemble heatsink if abnormality found
Yes
Is fan PCB assembly normal?
No
Replace fan PCB assembly
Yes
Recheck power and installation condition

Fan motor wire connection

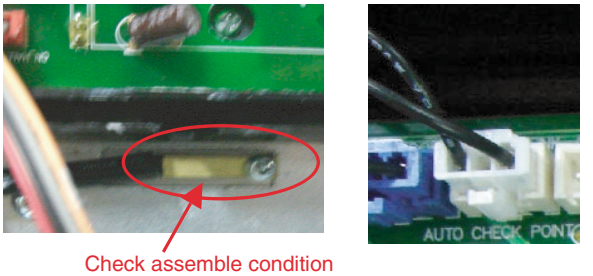


Fan IPM assemble position



Check assemble condition

Fan heatsink assemble position



Check assemble condition

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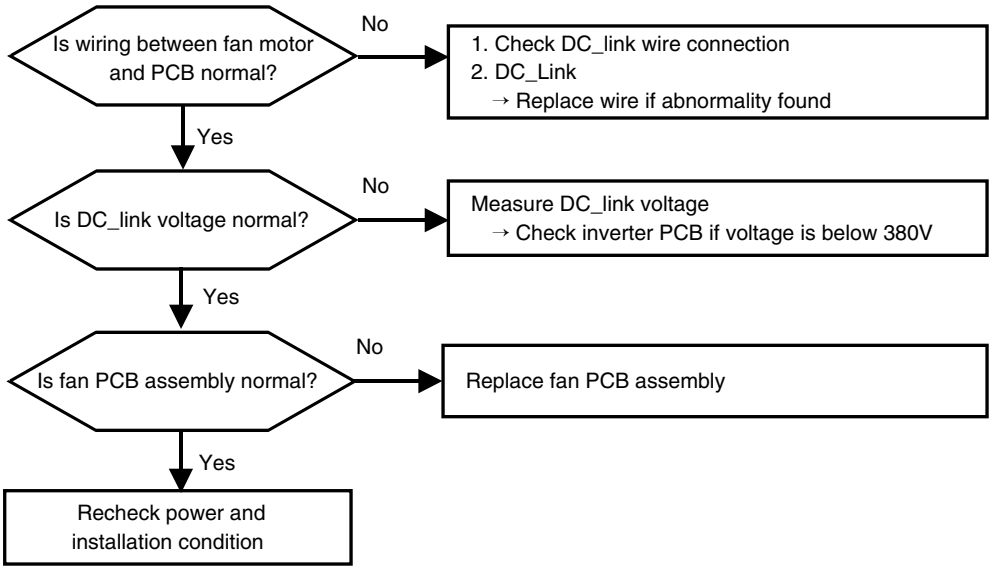
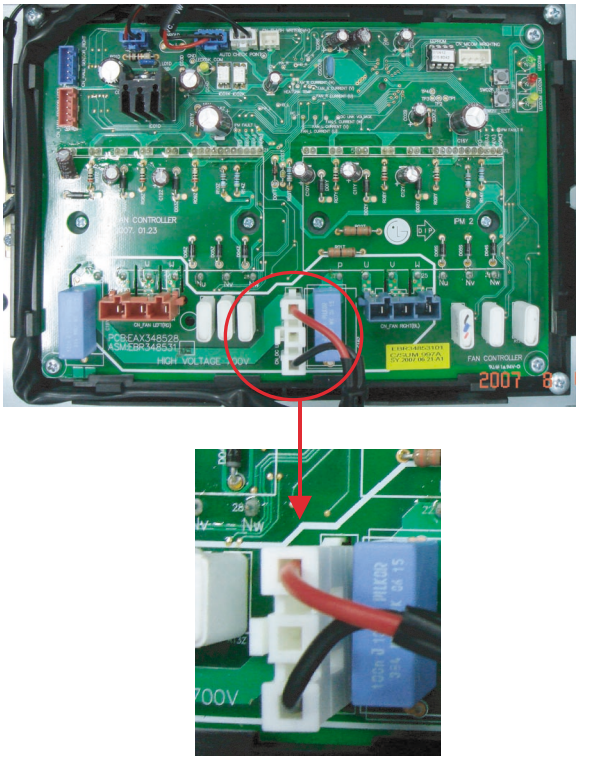
Error No.	Error type	Error point	Main reasons
107* Master 11 → 071 Slave1 12 → 072 Slave2 13 → 073	Fan DC link low voltage error	Fan PCB DC link voltage supplied below 380V	1. Wrong wiring between inverter PCB and fan PCB 2. Fan PCB assembly defect

■ Error diagnosis and countermeasure flow chart



DC voltage connection



DC Volt connected

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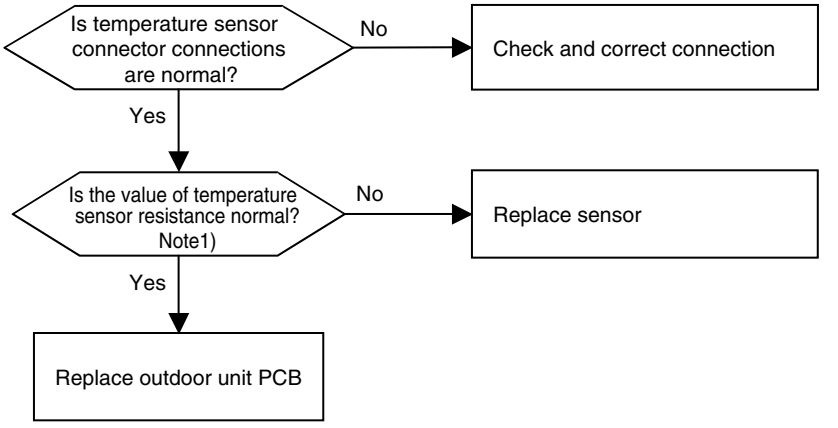
Error No.	Error type	Error point	Main reasons
113* Master 11 → 131 Slave1 12 → 132 Slave2 13 → 133	Outdoor unit liquid pipe (condenser) temperature sensor error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connection 2. Defective temperature sensor (Open / Short) 3. Defective outdoor unit PCB

Error No.	Error type	Error point	Main reasons
114* Master 11 → 141 Slave1 12 → 142 Slave2 13 → 143	Outdoor unit sub-cooling inlet / outlet temperature sensor error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connecter connection 2. Defective temperature sensor (Open/Short) 3. Defective outdoor PCB

■ Error diagnosis and countermeasure flow chart



Note1) Sensor resistance 100 kΩover (open) or 100 Ω below (short) will generate error

Note: Temperate sensor resistance vary with temperature, So compare temperature sensor resistance value according to outdoor unit temperature by referring below table (±5% tolerance)
Air temperature sensor: 10°C = 20.7kΩ : 25°C = 10kΩ : 50°C= 3.4kΩ
Pipe temperature sensor: 10°C = 10kΩ : 25°C = 5kΩ : 50°C= 1.8kΩ

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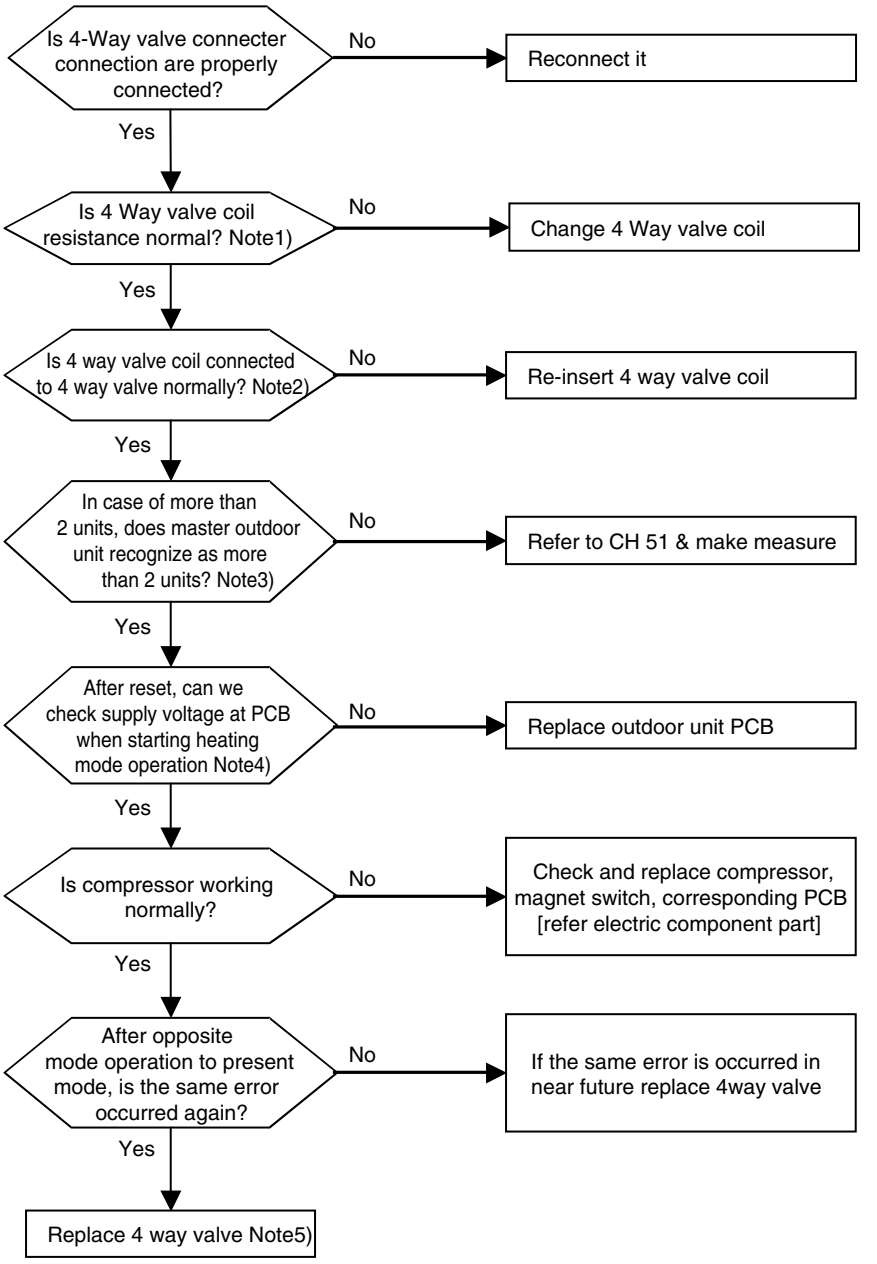
Error No.	Error type	Error point	Main reasons
151* Master 11→511 Slave1 12→512 Slave2 13→513	Function error of outdoor 4way (reversing valve)	Function error of 4way (reversing valve) in master or slave outdoor units	1. Wrong operation of 4way valve because of sludge etc. inflow 2. No pressure difference because of compressor failure 3. Wrong installation of In/outdoor common pipe 4. Defect of 4way valve

■ Error diagnosis and countermeasure flow chart


Is 4-Way valve connecter connection are properly connected?
No
Reconnect it
Yes
Is 4 Way valve coil resistance normal? Note1)
No
Change 4 Way valve coil
Yes
Is 4 way valve coil connected to 4 way valve normally? Note2)
No
Re-insert 4 way valve coil
Yes
In case of more than 2 units, does master outdoor unit recognize as more than 2 units? Note3)
No
Refer to CH 51 & make measure
Yes
After reset, can we check supply voltage at PCB when starting heating mode operation Note4)
No
Replace outdoor unit PCB
Yes
Is compressor working normally?
No
Check and replace compressor, magnet switch, corresponding PCB [refer electric component part]
Yes
After opposite mode operation to present mode, is the same error occurred again?
No
If the same error is occurred in near future replace 4way valve
Yes
Replace 4 way valve Note5)

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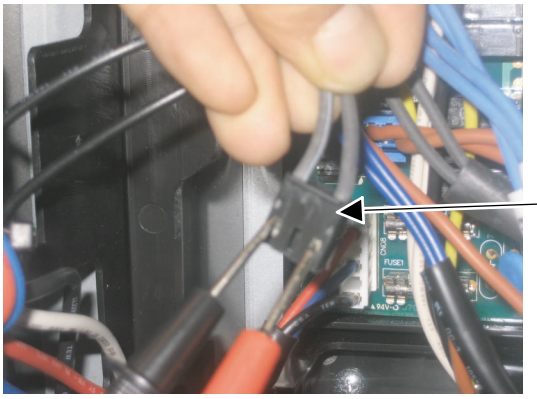
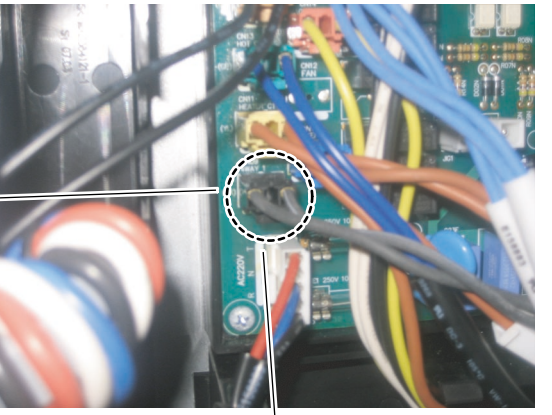
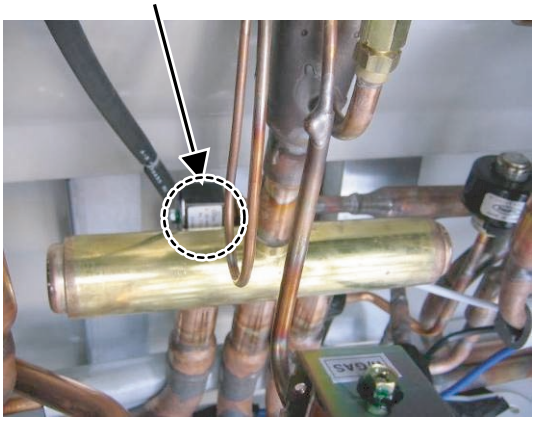
Note1) Measure the resistance of 4way valve



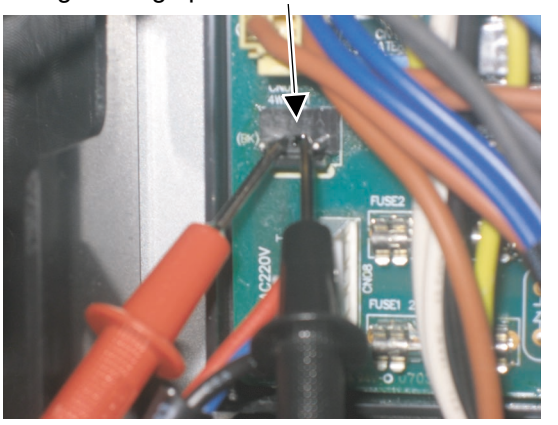
Location of 4way valve connector on main PCB(marked as 4way,CN09)



Note2) Confirm the 4way valve coil is inserted to the end



Note4) Check the output voltage of terminal socket during heating operation



Note3) When power is supplied in order as follow
(Slave2 → Slave1 → Mater)
Outdoor unit information is displayed one after the other at main PCB 7-segment

1. Model ID
   → 8HP:62 , 10HP:63, 12HP:64, 14HP:65
2. Total Capacity
   → Displayed with HP
3. Outdoor unit Type
   → Heat pump : 2, Cooling : 0
4. Normal mode : 25
5. Refrigerant
   → R410a : 41

Note5) Checking method for outdoor unit of 3unit system
(Master + Slave1 + Slave2)
① Close all the SVC valves of high / low pressure common pipe
② Operate system
③ Check the difference of high and low pressure with LGMV for each unit (Master, Slave1, Slave2)
④ If there is a unit in which the difference is not increased then the 4way valve of that unit is defective

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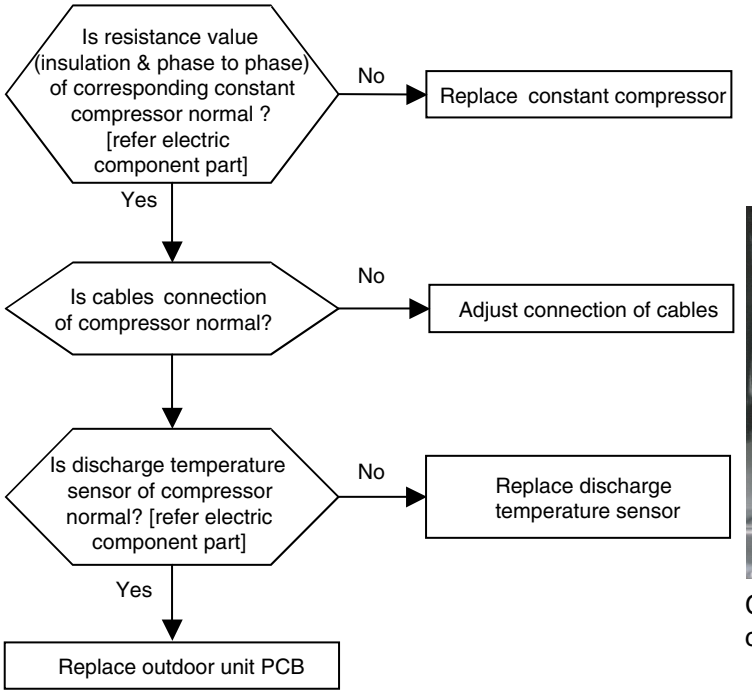
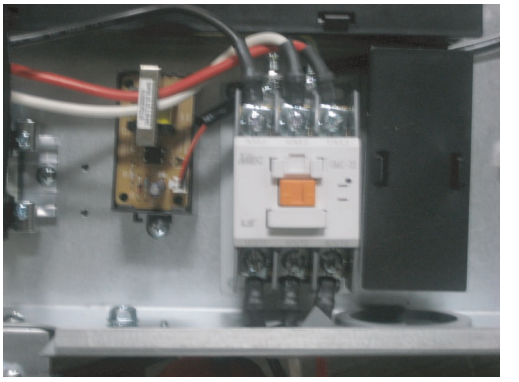
Error No.	Error type	Error point	Main reasons
173* Master 11 → 731 Slave1 12 → 732 Slave2 13 → 733	Constant compressor defect	Defect according to constant compressor damage or locking, over current	1. Constant compressor damage 2. Constant compressor input over current 3. Discharge temperature sensor defect

■ Error diagnosis and countermeasure flow chart


Is resistance value (insulation & phase to phase) of corresponding constant compressor normal ? [refer electric component part]
No
Replace constant compressor
Yes
Is cables connection of compressor normal?
No
Adjust connection of cables
Is discharge temperature sensor of compressor normal? [refer electric component part]
No
Replace discharge temperature sensor
Yes
Replace outdoor unit PCB



Cables connection between constant compressor and magnetic switch

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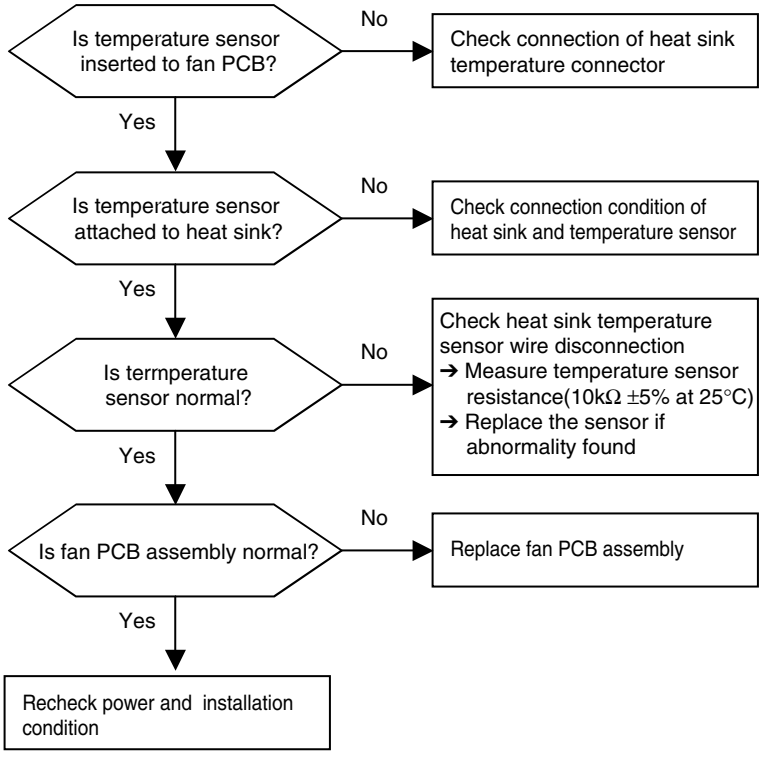
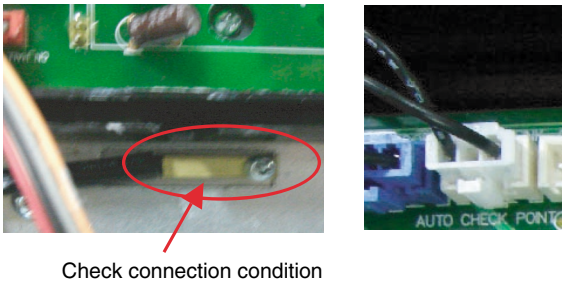
Error No.	Error type	Error point	Main reasons
193* Master 11 → 931 Slave1 12 → 932 Slave2 13 → 933	Fan PCB heatsink temperature high	Heat sink temperature is over 95°C	1. Heatsink temperature sensor defect 2. Fan PCB assembly defect
194* Master 11 → 941 Slave1 12 → 942 Slave2 13 → 943	Fan PCB heatsink temperature sensor error	Heatsink temperature sensor abnormal	1. Heatsink temperature sensor defect(Open/Short) 2. Wrong connection of temperature sensor connector 3. Fan PCB assembly defect

■ Error diagnosis and countermeasure flow chart

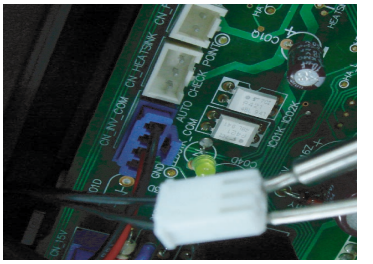

Is temperature sensor inserted to fan PCB?
No
Check connection of heat sink temperature connector
Yes
Is temperature sensor attached to heat sink?
No
Check connection condition of heat sink and temperature sensor
Yes
Is termperature sensor normal?
No
Check heat sink temperature sensor wire disconnection
➔ Measure temperature sensor resistance(10kΩ ±5% at 25°C)
➔ Replace the sensor if abnormality found
Yes
Is fan PCB assembly normal?
No
Replace fan PCB assembly
Yes
Recheck power and installation condition

Fan heat sink connection



Check connection condition

Checking temperature sensor disconnection



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Error No.	Error type	Error point	Main reasons
2001 Master 21 ➔ 001	Pipe detection error	After the auto operation, if the number of the indoor units detected is different from the number communicating indoor unit	1. HR unit's power cable or transmission cable connection defect 2. After auto-addressing, wrong address setting of the indoor unit (Defective indoor power / transmission error and PCB defect) 3. Wrong setting of the HR unit's rotary switch or dip switch 4. HR unit PCB defect

HR: Heat Recovery

■ Error diagnosis and countermeasure flow chart

1) Check the periodic blinking of the HR unit's green LED (transmission LED)

2) When green LED (transmission LED) of HR unit blinks regularly,
   2.1) Check input power of HR unit.(220V±10%)
   2.2) After reset of power of outdoor, wait for more than 30 minutes, temperature of pipes will be cool down then, do auto-addressing
   2.2) While power of HR unit is on, check total indoors display 'CH05' or not.(Refer to CH05)

3) When green LED (transmission LED) of HR unit blinks regularly, Check setting of rotary switch and dip switch, After reset of power of outdoor and HR unit, wait for more than 30 minutes, temperature of pipes will be cool dow then, do auto-addressing *

4) If indoor unit quantity is different between installed quantity and quantity which check thru piping searching, check pipe installation condition
   Outdoor unit ↔ HR unit ↔ Indoor unit

5) If indoor unit has not been connected to #1 valve of HR unit, set pipes of HR unit manually**

6) If it is not applied as above, set pipes of HR unit as manual

[NB] How to check display method of outdoor main PCB 7-segment ?:
'88' ➔ Indoor qty which check thru 'Auto-Addressing' ➔ '88' ➔ Indoor qty which check thru 'piping checking'

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Error No.	Error type	Error point	Main reasons
201C#HR	HR unit liquid pipe temperature sensor error	Abnormal value of sensor measurement (Open / Short)	• Defective temperature sensor connection • Defective temperature sensor (Open/Short) • Defective outdoor unit PCB

Error No.	Error type	Error point	Main reasons
202C#HR	HR unit Sub-cooling inlet pipe temperature sensor error	Abnormal value of sensor measurement(Open / Short)	• Defective temperature sensor connection • Defective temperature sensor (Open/Short) • Defective outdoor unit PCB

Error No.	Error type	Error point	Main reasons
203C#HR	HR unit Sub-cooling discharge pipe temperature sensor error	Abnormal value of sensor measurement(Open / Short)	• Defective temperature sensor connection • Defective temperature sensor (Open/Short) • Defective outdoor unit PCB

■ Error diagnosis and countermeasure flow chart

1) Check connection condition of temperature sensor and lead cable

2) Is value of temperature sensor normal? If not replace sensor
   - Piping temperature sensor : 10°C = 10kΩ : 25°C= 5kΩ : 50°C= 1.8kΩ

3) If connection of sensor and value is correct, replace outdoor unit PCB

■ HR unit error display No.

HR Unit	HR #1	HR #2	HR #3	HR #4	HR #5	HR #6	HR #7	HR #8	HR #9	HR #10	HR #11	HR #12	HR #13	HR #14	HR #15	HR#16
Error display	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12	C13	C14	C15	C16

■ Example of HR unit error display.

#16 HR unit Sub-cooling inlet pipe temperature sensor error 200 ➔ C16 (Repeat)

C: HR unit

#: HR unit Nuber

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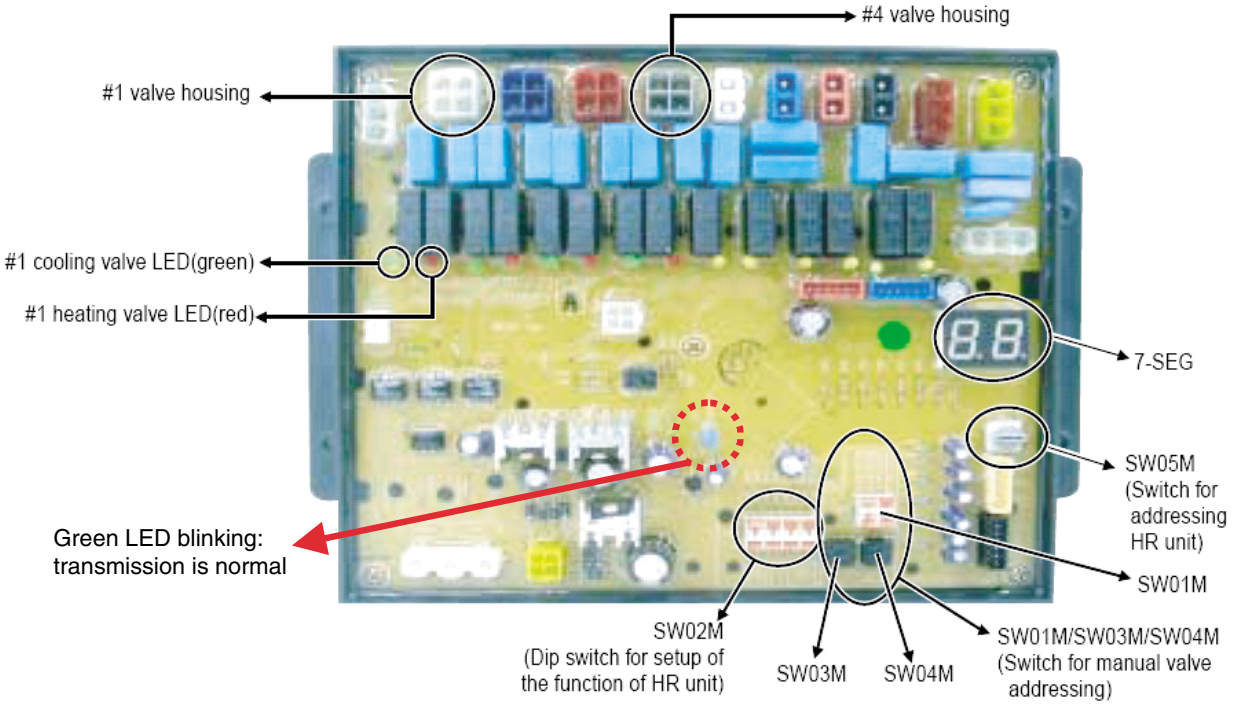
Error No.	Error type	Error point	Main reasons
204C#HR	Transmission error between the HR unit and outdoor unit	Transmission error between the HR unit and outdoor unit	1. Defective connection in HR unit power supply and transmission connection 2. Wrong setting of the HR unit rotary switch and dip switch 3. Defective HR unit PCB

■ Error diagnosis and countermeasure flow chart

1) Check connection between power cables and transmission cables, check transmission green LED blink of HR unit PCB
2) If transmission green LED blink of HR unit PCB is normal, check setting of rotary switch of HR unit and dip switch(Refer to CH200),
   Reset power of outdoor and HR unit
   (If transmission error of HR unit occurs, it can't be released until reset of outdoor power)
3) If transmission green LED blink of HR unit PCB is abnormal(not blinking,just on), check transmission condition of total indoor units(Refer to CH05)
   If transmission green LED blink of HR unit PCB is abnormal(not blinking, just on) even if transmission condition is normal, replace HR unit PCB

[NB] If Indoor units/transmission cables of HR unit and cables of power 220V has been changed each other, transmission parts and indoor will be burnt

HR Unit PCB



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